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[nr albumu 151945]

Consonant colour and vocalism in the history of Irish

[Barwienie spółgłosek i wokalizm w historii języka irlandzkiego]

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Poznań, dnia .....

OŚWIADCZENIE

Ja, niżej podpisany/a ..... student/ka Wydziału Anglistyki Uniwersytetu im. Adama Mickiewicza w Poznaniu oświadczam, że przedkładaną pracę dyplomową pt:
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(czytelny podpis studenta)

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List of abbreviations: grammatical terms

acc.	accusative
cop.	copula
dat.	dative
fem.	feminine
gen.	genitive
masc.	masculine
neg.	negative
neut.	neuter
nom.	nominative
pl.	plural
pst.	past
sg.	singular
voc.	vocative

List of abbreviations: sources

AÉ	*Auraicept na n-Éces* (Calder 1917)
AID	*Über die älteste irische dichtung* (Meyer 1913)
Ar.	*Archiv für Celtische Lexikographie*
Arm	*Book of Armagh* (Stokes and Strachan 1903: 238-43)
BDD	*Togail bruidne Da Derga* (Knott 1936)
BNnÉ	*Bethada náem nÉrenn* (Plummer 1922)
Bürg	*Die Bürgschaft im irischen Recht* (Thurneysen 1928)
CA	*Cáin Adamnáin* (Meyer 1905)
Cam	*Cambrai homily* (Stokes and Strachan 1903: 244-7)
CMO	*Cúirt an mheán-oíche* (Merriman n.d)
Cor.	*Cormac's glossary* (Stokes and O'Donovan 1868)
ED	*The expulsion of the Dessi* (Meyer 1901)
EIV	*Early Irish verb* (McCone 1987)
Fél	*Félire Óengusso céli dé* (Stokes 1905)
Fer	*The book of Fermoy* (Todd 1870)
HMin	*Hibernica minora* (Meyer 1894)
IB	*Imram Brain* (Meyer 1895)
IGT	Irish Grammatical Tracts (Bergin 1916, 1923, 1928, 1946, 1955)
K	Codex Augiensis CXXXII (Stokes and Strachan 1903: 225-30)
L&C	*Liadain and Curithir* (Meyer 1902)
LASID	*Linguistic atlas and survey of Irish dialects* (Wagner 1958-64)
Laws	*Ancient laws of Ireland* (Hancock et al. 1865-1901)
LB	*Leabhar Breac* (Ferguson, O'Curry and O'Looney 1876)

LEIA	*Lexique étymologique de l'irlandais ancien* (Vendryes 1959)
LGÉ	*Lebor gabála Érenn* (Macalister 1916)
LL	*Lebor Laignech* (Atkinson 1880)
LU	*Lebor na h-Uidri* (O'Longan 1870)
MD	*Metrical dindsenchas* (Gwynn 1903-35)
MF	*Morands Fürstenspiegel* (Thurneysen 1917)
Ml	Milan, Ambrosiana, MS C 301 (Stokes and Strachan 1901: 7-483)
MT	*The monastery of Tallaght* (Gwynn and Purton 1912)
Mulc	*O'Mulconry's glossary* (Stokes 1900)
RC	*Revue Celtique*
Rwl	Oxford, Bodleian Library, MS Rawlinson B 502 (Meyer 1909)
SG	*Silva gadelica* (O'Grady 1892)
Sg	St. Gallen Stiftsbibliothek, MS 904 (Stokes and Strachan 1903: 49-224)
TBC	*Táin Bó Cúalnge* (Windisch 1905)
TBC^2	*Táin Bó Cúailnge from the YBL* (Strachan and O'Keefe 1912)
Thes.	*Thesaurus palaeohibernicus* (Stokes and Strachan 1901, 1903)
Trip	*Bethu Phátraic* (Stokes 1877: 1-47, 138)
Trip	*The tripartite life of Patrick* (Stokes 1887)
Tur	Turin, MS F IV 1, 24 (Stokes and Strachan 1901: 484-94, 713-4)
Wb	Würzburg, MS M. p. th. f. 12 (Stokes and Strachan 1901: 499-712)
YBL	*Yellow book of Lecan* (Atkinson 1896)
ZCP	*Zeitschrift für Celtische Philologie*
ZIH	*Zu irischen Handschriften und Litteraturdenkmälern* (Thurneysen 1912)

Introduction

This thesis is concerned with the related questions of consonant colour and vocalism in the history of Irish, focusing particularly on the Old Irish period. It argues that Old Irish had three distinct series of consonant colour, and a vertical vowel system of only two members. This position is defended typologically, by means of a comprehensive survey of minimal and vertical vowel systems in the cross-linguistic literature, and also empirically, through a detailed description of Old Irish verbal morphology in terms of a phonological system with three consonant colours and only two vowels.

There is a pervasive contrast in consonant colour, also known as consonant quality, or secondary articulation, throughout the history of the Irish language (1.1-1.2), but scholars have disagreed on the number of distinct consonant colours which need to be posited for earlier stages of the language. The standard reference descriptions of Old Irish from the beginning of the twentieth century (Vendryes 1908; Thurneysen 1909, 1946; Pedersen 1909; Pokorny 1913, 1925) describe that language as having three distinct series of consonant colour or secondary localisation, i.e. i-colour, a-colour, and u-colour, alongside a short vowel system with five members.

In the second half of the century, David Greene (1962, 1973) instead argued that Old Irish had a two-way contrast in consonant colour and eight short vowel phonemes, which is the mainstream position put forward in more recent reference works (McCone 1996, 2005; Stifter 2006). However, in the last few years, this view has come under question, with a number of scholars instead arguing for a return to the previous view of three distinct series of consonant colour (Hock 2009; 2015; McCone 2015), sometimes in the context of a minimal or vertical short vowel system of two members in Old Irish

(Anderson 2014a, 2014b). Section 1.3.1 examines these differing approaches to consonant colour and vocalism in Old Irish.

The impetus to describe Old Irish in terms of a vertical vowel system comes from a changing understanding of Modern Irish phonology in the late twentieth century. While the traditional dialect descriptions from the middle of the century (Ó Cuív 1944; de Bhaldraithe 1945; Breatnach 1947; de Búrca 1958; Mhac an Fhalaigh 1968) describe Modern Irish dialects as having short vowel systems of five or six members, there was a growing awareness from the 1960s onwards that the front and back members of these systems were actually in complementary distribution, conditioned by the colour of surrounding consonants (Skerret 1967; Ó Siadhail and Wigger 1975). This view has recently also been argued for Scottish Gaelic (McConville 2013). The issues surrounding a vertical vowel analysis in modern Goidelic varieties are dealt with in detail in Roibeard O'Maolalaigh's doctoral dissertation (1997) and are dealt with in section 1.3.2 of this work.

In order to contextualise the arguments for the existence of a vertical vowel system in the various historical periods of the Irish language, and to uncover useful analytical comparanda, a comprehensive survey of vertical vowel descriptions (2.1) in the linguistic literature is carried out in section 2.2. Although the existence of such systems has been acknowledged since the early days of structuralist linguistics (e.g. Jakovlev 1923), this is the first time that all of the relevant examples have been drawn together and discussed, and thus constitutes an important contribution to the phonological typology literature.

In some instances, vertical and minimal vowel systems have been described widely across phylogenetic or areal groups of languages, such as in Northwest Caucasian (Hewitt 2005), the Arandic languages of Australia (Breen 2001), the Sepik-Ramu languages of Papua New Guinea (Foley 1986), the Goidelic languages (see above), and the Central Chadic languages (Barreteau 1987). In other cases, individual languages have been described as having minimal vowel systems, such as Chinese (Chao 1968), Marshallese (Bender 1968), the Caddoan language Wichita (Rood 1976), the Salishan language Nuxálk (Nater 1984), and the Arnhem language Anindilyakwa (Leeding 1989).

This survey of vertical and minimal vowel systems not only raises theoretical questions for our understanding of phonological systems (2.3), but also furnishes useful

comparanda for the description of Irish phonology. In particular, the analysis of long vowels in some of these languages as deriving from a combination of a short vowel and a glide, or abstract consonant, specified only for secondary localisation (Kuipers 1960 for Kabardian; Bender 1968 and Choi 1992 and 1995 for Marshallese) can be fruitfully applied to Old Irish, where it drastically simplifies the statement of vowel alternations in a number of morphological forms.

Chapter 3 deals with orthography and phonology in Old Irish. In 3.1, it is argued that the Old Irish orthographic system is an innovation of the Latin model designed to capture the facts of consonant colour in the language. There are often functional explanations for permitted ambiguities in the orthography, and inconsistencies in the orthography of vowels can be interpreted as reflecting variety in the phonetic exponence of certain phonological categories in given environments. Assymetries in the spelling of high vowels before u-colour labial and velar consonants on the one hand, and u-colour coronal consonants on the other, find parallel in Modern Irish dialects, and point to the influence of primary localisation on the occurrence of transitions in colour (or chromatic transitions) in the language (3.1.2.5).

The Old Irish phonological system is described in 3.2 in terms of percepts indexed to hierarchically organised clusters of acoustic cues. This understanding of phonology is proposed on the basis of insights from phenomenology and Cognitive Linguistics, and the notion of image schemata (Johnson 1987) is put forward to present a novel model of consituent structure (3.2.1.1-3.2.2.3).

At the most sonorous end of this constituent hierarchy are acoustic phenomena associated to vowels, such as stress, and cues differentiating the two short vowels of the language, /a/ and /ə/, represented here as high and low percepts of the first formant. Distinctions in consonant colour involve rather percepts associated primarily to the second formant. As regards consonant representations, there is good evidence that nasality and aspiration operate on the same phonological dimension in Old Irish, represented as low and high respectively, with plain obstruents as a mid point (Gnandesikan 1997). At the top of the hierarchy are cues such associated with primary localisation (3.2.1.4). On the basis of these representational conventions, representations for different classes of consonants (3.2.2) and vowels (3.2.3) emerge.

A number of morphonological and phonological phenomena are necessary for a complete description of Old Irish phonology. The phenomenon of consonant mutation

can be described in terms of loss or gain of specification at certain points in the hierarchy (3.3.1). There are epenthetic vowels to break up illicit consonant clusters, and excrescent consonants to repair illicit vowel structures, while syncope regularly deletes every second, non-final vowel (3.3.2). Interacting with these phenomena are assimilations of specifications at various points in the consitutent hierachy (3.3.3).

A description of the Old Irish verbal system (McCone 1987) is put forward in chapter 4, in order to show the advantages of the posited phonological system and to prepare the ground for the empirical description of the Old Irish verb in chapters 5 and 6. Old Irish is widely recognised to have one of the most complex verbal systems of any older Indo-European language. A key feature is the extensive use of preverbal particles, which serve to alter the semantics of verbal roots. Generally speaking, only one such particle may occur before the main stress in the phonological phrase. This gives rise to a complex system of verbal flexion, in which one series of inflexional endings is used when there is at least one preverbal particle, while another is used when such particles are absent. With compound verbs, i.e. those with one or more preverbal particles, the addition of a further particle, such as a negative or interrogative marker, causes the first particle to fall under the main stress. The preverbal particles have different allomorphs in tonic and pretonic position, and when a particle takes primary stress there are far-reaching phonological consequences, as the material immediately to its right, including the vowel root, moves into unstressed position, thus becoming vulnerable to syncope.

It is argued that this complex system can be best explained by the adaption and formalisation of some of the insights of the traditional Irish grammarians, who identified a type of prosodic hierarchy for Classical Irish, laid out in the Irish Grammatical Tracts from the twelfth century onwards (Bergin 1916, 1923, 1928, 1946, 1955; Adams 1970). This system can be modified to account for the distributional facts of Old Irish, taking into account the status of infixed and suffixed pronouns, postverbal person clitics and person endings withing the Old Irish verbal complex.

Having laid out the preliminaries, the inflexion of the Old Irish verb is explored in terms of the three-way distinction in consonant colour and two-member vowel system posited in this work. The Old Irish verb distinguishes five different stem formations, for the present, subjunctive, future, preterite, and preterite passive, as well as active, deponent and passive flexion for most of these. The present stem is examined in chapter 5, with cited examples for each person and number in all classes of verbs. Care-

ful study of the attested verbal forms leads to improvements to existing descriptions, including the identification of classes which are not dealt with in a consistent way in the previous literature, as in 5.1.3.2.

Chapter 6 examines the flexion of the subjunctive, future, and preterite active stems. In many cases, the phonological system posited allows many patterns to be stated in a more regular fashion, meaning that a number of supposed irregularities are shown to be regular, and leading thus to a more streamlined statement of the verbal morphology. The collation and careful study of specific examples from Old Irish texts in chapters 5 and 6 mean that work can serve as a point of reference for future studies into the Old Irish verb.

Chapter 1, below, introduces the Irish language and its grammatical structure, and surveys the existing literature on the principal topics addressed in this dissertation.

Chapter 1: The Irish language and consonant colour

1.1. Periodisation and literature review

This section provides a periodisation of the Irish language and gives an overview of primary and secondary sources relevant to the topic of this thesis. Subsection 1.1.1 traces the historical development of the Irish language and identifies the most important source materials for the study of historic periods of the language, and for Old Irish in particular. Subsection 1.1.2 identifies the key secondary literature on the phonology of Irish throughout its historical development.

1.1.1. Periodisation and primary sources

The earliest attestations of a language which is recognisably Irish consist of inscriptions on stone in the ogham script, dating from the first half of the first millennium CE and later. These consist of angular marks cut left, right or across a central line, most often the edge of a stone.[1] They are found predominantly in the south of Ireland, with some also in what is now Wales and Scotland, with isolated examples elsewhere in Britain. The standard corpus for the ogham inscriptions in Ireland is Macalister (1945, 1949), while collections of material from Scotland (Forsyth 1996) and Britain more generally (Sims-Williams 2003) have also been collated. McManus (1991) gives a thorough overview of the inscriptions and reviews the literature pertaining to them.

[1] There are references to the use of ogham on wood in the early Irish tales (e.g. TBC 455-9; AÉ 2800-4), although to my knowledge, no sure examples have surfaced in the archaelogical record. However, the morphology of the script suggests that medium and the letters of the ogham alphabet are associated with plant names (see McManus 1988).

Unfortunately, most attestations in ogham are formulaic genitive constructions, meaning that their use as linguistic evidence is severely limited.

During and after the conversion of Ireland to Christianity there is evidence of extensive lexical and stylistic borrowings from Latin, and to a lesser extent Brythonic, into Irish. The consensus view is that Old Irish orthography is, for the most part, based on a Brythonic model derived from the contemporary pronunciation of Latin (Harvey 1989: 56-7; Ahlqvist 1994: 29). This Brythonic model is most evident in the orthography of the consonants, where <b d g> most often represent fricatives /β ð ɣ/, while the singletons <p t k> typically represent lenis stops /b d g/ and the doubletons <pp tt cc> fortis stops /p t k/, echoing to a degree the lenition trajectories in contemporary Brythonic.[2] However, a competing Irish orthographic tradition existed in parallel to the Brythonic model, continuing from the ogham period onwards (Ó Cróinín 2001). The orthography of Old Irish is discussed in detail in 3.1, where I argue that the orthography of vowels in the language is actually highly innovative with respect to either Latin or Brythonic, expressing structural properties of the native phonology for which there were no parallels in either.

Old Irish is the term given to the literary language of the eighth and ninth centuries. This period of the language is the first for which there is extensive attestation allowing one to directly observe in detail all aspects of linguistic structure. It is consequently the key focus of this work. Chapter 3 discusses the phonology of Old Irish, as well as its orthography, while chapter 4 outlines its verbal system, and chapters 5 and 6 give a thorough account of verbal flexion in the language.

The most important material for the linguistic study of Old Irish consists in glosses on Latin manuscripts, assembled in the two volumes of the *Thesaurus palaeohibernicus* (henceforth Thes.: Stokes and Strachan 1901), with the Würzburg (Wb), Milan (Ml) and St. Gall (Sg) glosses comprising a large proportion of that collection. The Würzburg glosses are found on a commentary on the Epistles of Paul, the Milan ones on a commentary on the psalms, and the St. Gall ones on a copy of Priscian's Latin grammar. These materials constitute the most important source material

[2] In Brythonic, the lenis stops /b d g/ were lenited into fricatives /β ð ɣ/, while the fortis stops /p t k/ were lenited into lenis ones /b d g/. In Goidelic, meanwhile, all stops, i.e. /p t k b d g/, were lenited into fricatives.

for Old Irish, and the vast majority of my examples, particularly in chapters 5 and 6, below, are drawn from them.[3]

I have, however, also drawn from various other primary sources, for the most part drawn together during the great flowering of Celtic scholarship at the turn of the twentieth century. This includes other material in the *Thesaurus*, including further selections of glosses, such as those of Turin (Tur) and Karlsruhe (K), and also the early Old Irish material from the *Book of Armagh* (Arm). As my main empirical focus was the verbal system, I found *Félire Óengusso* (henceforth Fél: Stokes 1905) to be a particularly useful source of examples, due to its wealth of verbal forms. I have also taken isolated examples where necessary from a wide variety of other texts, published for the most part in various Celtic journals in the early twentieth century.

From the beginning of the ninth century, Irish was in contact with Norse[4] and from the beginning of the tenth Old Irish began to give way to Middle Irish, in which many of the more complex morphological structures of Old Irish began to break down. It is from this period that many of the most important collections of Early Irish[5] literature date. These include extensive series of annals, as well as the twelfth century *Lebor na huidre* 'the Book of the Dun Cow' (henceforth LU: O'Longan 1870) and *Lebor Laignech* 'the Book of Leinster' (henceforth LL: Atkinson 1880). While I have generally avoided using examples from these when earlier sources are available, I have occasionally included citations from these and other later sources, generally with a note of caution, where they are not. Material from both the Old and Middle Irish periods has been collected together in the invaluable *Dictionary of the Irish Language* (henceforth DIL: Quin et al. eds. 2007).[6]

By the twelfth century, the differentiation of popular forms of speech across the Goidelic[7] area was already well underway, and from the eleventh century onwards in Scotland and the twelfth century onwards in Ireland they came into intensive contact

[3] A useful lexicon of the Würzburg glosses has been published (Kavanagh 2001) and the databases of the Milan and St. Gall glosses (Griffith and Stifter 2007-2013; Bauer and Schumacher 2014) proved invaluable to me in searching for less frequent forms.

[4] The extent of this contact and its influence has been explored by i.a. Sommerfelt (1952), Borgstrøm (1974) and Schulze-Thulin (1996).

[5] *Early Irish* is used here as a convenient cover term for both the relatively uniform Old Irish language of the glosses and the more vagarious subsequent material, prior to the standardisation which brought about Classical Irish in the twelfth century.

[6] Available online at edil.qub.ac.uk.

[7] Used here, as is customary, as a cover term for Old Irish, its immediate ancestral forms, and its descendents, namely the varieties of Irish, Scottish Gaelic, and Manx.

with both English and Norman French. In Ireland, the form of the spoken language in this period is known as Early Modern Irish, to differentiate it from Classical Irish, a codified literary version of the language, which continued as a common literary language across the Goidelic area until well into the seventeenth century. While the language of this period is not the principal empirical focus of this work, the native grammatical tradition developed most productively in the Classical Irish period has strongly influenced the grammatical model adopted in this dissertation, as outlined in subsection 1.2.2, below.

Even though the period from the seventeenth century to the current day has been marked by language shift from Irish into English, generally proceeding from east to west, varieties of Modern Irish have survived into the current century in some areas of the south and west coasts of Ireland. Subsequent to the formation of an independent polity on the island, Irish became enshrined as the first language of state in the constitution of 1937, and underwent both orthographic reform and standardisation. While this thesis focuses primarily on the Old Irish period, the Modern Irish dialect material is highly relevant, as it provides the most comprehensive attestation of any period of the language, particularly with respect to phonetic and phonological particulars.

In the preceding paragraphs, I have given a brief overview of the periodisation of the Irish language and identified the most important primary sources drawn upon in this thesis. The following subsection looks at the Irish language in terms of its genealogical relationships, and discusses the key secondary sources which have been drawn on during the course of this work.

1.1.2. Genealogical relationships and secondary sources

Irish belongs to the Celtic family of the Indo-European language stock. The linguistic use of the term Celtic dates to the *Archaeologica Brittanica* of Lhuyd (1707), which correctly identified a genetic relationship between the surviving Brythonic and Goidelic languages and the Gaulish language of antiquity. The identification of this distinct grouping as Indo-European was made by Bopp (1839), and subsequent to his work the Celtic languages became an object of enquiry for comparative philologists interested in the historical reconstruction of Indo-European.

Within the Celtic family, it is customary to distinguish between the Celtic languages spoken on mainland Europe in antiquity, collectively known as Continental Celtic (Eska and Evans 1993, 2009), and the Celtic languages attested somewhat later in the Isles,[8] known as Insular Celtic.[9] The former includes Gaulish (Lambert 1994; Delamarre 2003), Lepontic, and Celtiberian (Wodtko 2003; Jordán Cólera 2007),[10] while the latter comprises two main groups: Goidelic and Brythonic. The modern Goidelic languages – Irish, Manx, and Scottish Gaelic – descend more or less directly from Old Irish, and are considered by Ó Baoill (2000) to form a dialect continuum. The modern Brythonic languages include Welsh, Cornish, and the dialects of Breton.

The internal classification of the Celtic languages is disputed. Some scholars propose a Gallo-Brythonic node to the exclusion of Goidelic and Celtiberian (e.g. Schmidt 1977; J. Koch 1992a). This division is parallel to the long-standing convention of speaking of P-Celtic and Q-Celtic to distinguish those dialects in which voiceless labiovelar stops became bilabials, i.e. *k^w > p, and those in which they did not.[11] An alternative view considers the Insular Celtic languages to constitute a genetic rather than just an areal grouping (e.g Schrijver 1995; McCone 1996), opposed to the Continental Celtic languages. Others straddle the two positions, either arguing that many of the similarities between the Insular Celtic languages result from language contact rather than genetic inheritance (e.g. Matasović 2007) or by criticising *Stammbaum* models of linguistic relationships (e.g. Isaac 2005).

The categorisation of the Celtic languages is not directly relevant to this study, where the focus is largely on Goidelic. However, it should be noted that many of the particular phonological, morphological and syntactic features of the Goidelic languages also occur in Brythonic, particularly the phenomenon of initial consonant mutation, discussed briefly in 1.2.2, below, and in more detail with reference to Old Irish in 3.3.1. The Continental Celtic languages are less useful comparanda: aside from their poorer attestation they do not seem to share the particularities of phonology and especially

[8] Used here as a cover term for Ireland, Britain and the surrounding islands, with *Insular* a useful corresponding adjective.

[9] Continental Celtic does not appear to be a valid phyletic node, and it is doubtful if Insular Celtic is either. However, it is useful to differentiate the two groups, not only on temporal and geographical grounds, but also because of they are strikingly different typologically, as discussed further in 1.2.1, below.

[10] Recent scholarship (J. Koch 2010) has also argued that Tartessian (Rodríguez Ramos 2002), attested from the southwest of the Iberian peninsula in the early and middle part of the first millennium BCE, may also be a Celtic language.

[11] This isogloss separates Brythonic, Lepontic and most varieties of Gaulish on the one hand, from Goidelic and Celtiberian on the other.

syntax that set the Insular Celtic languages so drastically apart from other Indo-European tongues.

The first comprehensive historical grammar of the Celtic languages was the *Grammatica Celtica* of Zeuß (1853). To a large extent it has been superseded by later works such as Pedersen's (1909) *Vergleichende Grammatik der keltischen Sprachen* (henceforth VGK), as well as the same author's later collaboration with Lewis (Lewis and Pedersen 1937), but provided a basis for future scholarship. The late nineteenth and early twentieth centuries saw extensive collection and translation of early Celtic material by predominantly German speaking scholars. The earliest book-length grammars of specific early Celtic languages also date to this time (e.g. Windisch 1879) and some of them (e.g. Vendryes 1908; Thurneysen 1909; Strachan and Meyer 1908; Morris-Jones 1913) continue to be invaluable points of reference.

Already in the Old Irish period, a certain amount of linguistic research was taking place. The St. Gall glosses are on a copy of Priscian's Latin grammar and contain a significant quantity of linguistic terminology. The text known as *Auraicept na n-éces* 'The scholar's primer' (AnÉ: Calder 1917), some of the material of which is datable on linguistic grounds to the Old Irish period, contains both a spirited defence of the vernacular and a considerable quantity of grammatical discussion, explicitly contrasting Irish and Latin, and, to a lesser extent, other languages.

The modern academic study of Early Irish grammar, and phonology in particular, starts in the second half of the nineteenth century. The first book-length study of which I am aware which regarding a specific early Celtic language is Windisch's grammar of Old Irish (1879). Other important early contributions dealing specifically with Early Irish, rather than Celtic more broadly, are Pedersen's *Aspirationen in Irsk* (1897) and Bergin's *Palatalisation* (1907). However, the magnum opus of studies in Early Irish is Rudolf Thurneysen's *Handbuch des Alt-Irischen* (1909), translated into English as *A Grammar of Old Irish* (henceforth *GOI*) by Binchy and Bergin in 1946.

Less celebrated than Thurneysen's grammar are those of Vendryes (1908) and O'Connell (1912). While the latter is essentially a rewriting of the Thurneysen (1909) for an English-speaking audience (O'Connell 1912: vii) the former has independent worth. This period also saw publication of Dottin's study of Middle Irish (1913) and Pokorny's work on Old Irish (1913, 1925).

Historical and comparative work on Old Irish continued throughout the twentieth century, and although it is not the place to give a complete overview here, the work on the verbal system undertaken by Watkins (1962) and later Kim McCone (2006) should be mentioned, as these were particularly useful in elaborating my description of the phonology of the Old Irish verbal system in chapters 5 and 6, in particular McCone's (1987) *Early Irish verb* (henceforth *EIV*).

Didactic and reference materials for Old Irish have improved considerably in recent years, with the publication of Anthony Green's *Old Irish verbs and vocabulary* (1995), David Stifter's *Sengoidelc* (2006) and McCone's *Old Irish grammar and reader* (2005), which usefully supplement older materials such as Strachan's *Old Irish paradigms* (1909), Quin's *Old-Irish Workbook* (1975) and the grammar of Lehmann and Lehmann (1975).

Descriptions of specific dialects of Modern Irish begin from the end of the nineteenth century with the publication of Henebry's *The sounds of Munster Irish* (1898) and Finck's *Die araner Mundart* (1899), followed in the early twentieth century by Quiggin's *A dialect of Donegal* (1906). In the next few decades these were supplemented by a number of other studies, including Sommerfelt's work on the dialect of Torr (1922a) and South Armagh Irish (1929a); Sjostedt-Jonval's research into Kerry Irish (1931, 1938); and Holmer's (1940) account of the Antrim dialect. Of special importance in this period is O'Rahilly's synthetic *Dialects of Irish* (1932), which is still an important resource for the study of Irish dialects.

A certain number of phonetic introductions to the language also appear in this period, often designed to help learners of the language. The earliest of which I am aware is O'Flanagan (1904), although Ó Cuív (1921) is better known. More sophisticated, and drawing strongly on contemporary European phonetic scholarship, is Ó Máille's *Urlabhraidheacht agus graiméar na Gaedhilge* (1927). In spite of Sommerfelt's scathing criticism (1929b), this book is important in that it is the first book in the Irish language of which I am aware which deals with phonetics, coining much new linguistic terminology in the process.

There had been ongoing discussion before the Second World War (WW2) about the preparation of a linguistic atlas of the Irish dialects. The work was eventually entrusted to Heinrich Wagner, who carried out much of the fieldwork himself and published it in four volumes as the *Linguistic atlas and survey of Irish dialects* (LASID: Wagner 1958-64). Two important grammatical descriptions of Irish dialects also appear

in the 1950s: Wagner's own *Gaeilge Theilinn* (1959a) and de Bhaldraithe's grammar of Cois Fhairrge Irish (1953).

From the 1940s the Dublin Institute of Advanced Studies (DIAS) commissioned a series of studies of a number of Irish dialects. These studies all follow a similar template, strongly influenced by the London school of phonology under Daniel Jones and conforming broadly to structuralist principles.[12] The first to appear was Ó Cuív's (1944) study of the *Irish of West Muskerry*, followed in short order by de Bhaldraithe's (1945) account of the dialect of Cois Fhairrge and Breathnach's of the Irish of Ring (1947). These three were subtitled *phonetic* studies, in contrast to the latter additions by de Búrca for the Irish of Tourmakeady (1958) and Mhac an Fhailigh (1968) for that of Erris, which although part of the same series, were subtitled *phonemic* studies.

In spite of the fact that these studies all follow a similar template, the difference in nomenclature is not entirely cosmetic. In de Búrca's work (1958) in particular, the influence of contemporary European and North American structuralism is apparent and the phonemic principle is applied more rigorously than in previous treatments, leading him to correctly identify the allophony present in the Irish short vowel system (de Búrca 1958: 9). The contributions of de Búrca set him apart, to my mind, as the greatest of the Irish structuralists, publishing the only twentieth century study of Irish phoneme frequency (de Búrca 1960a),[13] as well as making an important analysis of epenthesis (de Búrca 1980). His paper on syllabicity and palatalisation (de Búrca 1979) was of great influence in the analysis of Old Irish vocalism put forward here (see also 3.1.2.5).

Further studies of specific dialects of Irish include Ó Baoill's (1978) comparative study of Ulster Irish and Scottish Gaelic, Hamilton's account of the Irish of Tory island (Hamilton 1974); Stockman's work on the Achill dialect (Stockman 1974); Ó Sé's of that of Corca Dhuibhne (2000), and Ó Curnáin's comprehensive study of the Irish of Iorras Aithneach (2007), as well as Ó Direáin's study of the Irish of the Aran Islands (2015).[14] In addition to these, two works give a more general overview of the Irish dialects. Ó Siadhail (1989) looks at the grammatical structure and dialectal variation of Modern Irish from a generativist perspective, dealing with phonology,

[12] The person recruited to train the Irish scholars to write these dialect surveys, Eileen Evans (later Eileen Whitley) later became associated with the Firthian school, and is, I believe, the first person to have understood Irish phonology in terms of a vertical vowel system. This is discussed further in 1.3.2, below.

[13] Recent years have seen a little more focus on this topic. There is some discussion of phoneme frequency in Hickey (2012: 54-70) and my own study of consonant frequency (C. Anderson 2013) builds explicitly on de Búrca's work.

[14] Available online at aranirish.nuigalway.ie.

morphology and syntax in turn. Hickey (2012) is in a broadly structuralist vein and also includes a thorough overview of the relevant literature.

There have been a number of treatments of Irish phonology from within the generativist tradition. Ó Siadhail and Wigger (1975) has a similar approach to Chomsky and Halle (1968). Ó Dochartaigh (1979) deals with consonant lenition from the framework of Dependency Phonology, while Cyran (1997) and Bloch-Rozmiej (1998) look at Munster and Connacht Irish respectively using a Government Phonology approach. Ní Chiosáin (1991) is a treatment within the theoretical framework of Feature Geometry, while Green (1997) looks at the prosodic structure of the Goidelic languages using the theoretical machinery of Optimality Theory. Of monograph length generativist works looking at Old Irish phonology I am aware of only Deirdre Kelly's dissertation *Morphologization in Irish and Southern Paiute* (1978), which, it seems to me, has received less attention than it deserves, and Krysztof Jaskuła's (2006) dissertation. The latter deals with a wide variety of phonological phenomena in Old Irish, and indeed in its prehistory, within the framework of Government Phonology.

This subsection has given an overview of the general secondary literature on Irish phonology most relevant to this work. Further literature relevant to the specific questions of discussed in the course of this dissertation is provided where necessary below, particularly in section 1.3, which introduces the related themes of consonant colour and (vertical) vocalism which form the core focus of this thesis.

Having outlined the periodisation of Irish and its genealogical affiliation in this section, alongside the discussion of relevant primary and secondary literature, the next section discusses key grammatical features characteristic of the various stages of the Irish language, with reference also to typological and areal considerations.

1.2. The grammatical structure of Irish

This section outlines the grammatical structure of the Irish language. Subsection 1.2.1 contextualises key features of Irish morphosyntax in typological and areal perspective, while subsection 1.2.2 provides a model of prosodic constituency in Irish based on the native grammatical tradition. This is a necessary prelude to Chapter 4, in which the details of this model are fleshed out with reference to the Old Irish verbal system.

1.2.1. Irish grammar in typological and areal perspective

While it is now beyond dispute that Irish is an Indo-European (IE) language, it has a number of grammatical and phonological features, many of which are shared by the other Insular Celtic languages, which are altogether uncommon when viewed against the backdrop of other IE languages. The most striking of these features include basic VSO constituent order, discussed briefly alongside other morphosyntactic characteristics of this language in this subsection, and the phenomenon of initial consonant mutation, outlined in 1.2.2, below, and discussed in more detail with respect to Old Irish in 3.3.1.

Independently of this, some scholars argue that many European languages have converged significantly in a number of areas of their grammars, using the term Standard Average European (SAE) languages (Whorf 1956: 138), to refer to languages belonging to the resulting areal complex. However, in discussions on this topic, it is widely recognised that the Insular Celtic languages are either peripheral to this complex (Hock 1986: 508–9; Kortmann 1998: 507) or are not SAE languages at all (Haspelmath 1998: 273; Haspelmath 2001: 1505; Haspelmath and Buchholz 1998: 326–7).

Unlike any other IE languages,[15] dominant word order in the Insular Celtic languages is Verb-Subject-Object (VSO),[16] a feature shared by around 8% of languages with a dominant word order in a 1188 language sample (WALS 81A).[17] Of those languages with a basic Verb-Object constituent order, the Celtic languages are quite typical, with prepositions rather than postpositions (WALS 95A, 92% of 498 languages); a dependent genitive which follows the noun (WALS 83A and 86A, 77% of an 520 language sample);[18] and generally place the adjective after the noun (WALS 97A, 80% of 570 languages). These are all features identified by Greenberg as being prototypical of VSO languages in his ground-breaking work on word order typology (1966a: 77-78).

[15] There are possible traces of basic VSO word order in certain historic varieties of Romance (Wanner 1989; Wolfe 2015).
[16] Surface word order occasionally deviates from this, particularly in Breton and Cornish and occasionally also in Old Irish (see Bergin 1938a).
[17] Numbers here and in the following refer to the feature numbers given in the *World Atlas of Language Structures* (WALS: Dryer and Haspelmath 2011).
[18] This figure is particularly high for languages with basic VSO rather than SVO constituent order (WALS 81A and 86A, 96% of an 80 language sample).

It is possible that a number of further features of the Insular Celtic languages may be correlated to VSO typology.[19] One example is the category of inflected prepositions, whereby in Modern Irish, for example, the locative preposition *ag* 'at' is inflected for person and number, hence, e.g. MIr. *aige* 'at-him', *aici* 'at-her', *againn* 'at-us'. Of VSO languages, 63% of 19 languages show this feature, compared to 32% of SVO languages and 35% of SOV languages. The small sample size for these features (WALS 48A and 81A) makes it hard to draw firm conclusions however.

An even more striking case is nominal and locational predication (WALS 117A). Here, Irish has two different verbal forms which correspond to the English verb 'to be'. The first, known as the copula, is used for nominal predication and in cleft constructions, etc., e.g.

(1) *is* *athir-* *som*
COP father 3SG.MASC.
'he is (the) father' (Wb2c11)

The second, known as the substantive verb, is used in locational predication and in periphrastic progressive constructions, e.g.

(2) *bhí* *glasra* *fáis* *ann*
be-PAST greenery growing-GEN. in-3SG.MASC.
'greenery was growing there' (CMO: 14.29)

This feature also appears to correlate with verb initial constituent order: of 40 verb initial languages in the sample, all of them, 33 VSO and 7 VOS, had different forms for nominal and locational predication (WALS 81A and 119A). This corresponds to 60% of 125 SOV languages and 71% of SVO languages.

The Insular Celtic languages, in contrast to the Continental Celtic ones and SAE languages, have no relative pronouns, but instead use relative particles. Old Irish also had special relative forms for certain persons and numbers of the verb, a phenomenon also found residually in Connemara Irish (de Bhaldraithe 1953: 70-1, 83-4). The relative

[19] Recent decades have seen greater focus on the syntactic typology of VSO languages (Carnie and Guilfoyle 2000; Carnie et al. 2005).

strategies of the Insular Celtic languages are not at all unusual cross-linguistically (WALS 122A and 123A), where it is actually the relative pronoun strategy that stands out as typologically marked. For this particular feature, Insular Celtic is therefore very much in the typological mainstream, but bucks the trend areally.

Care should be taken in these discussions not to treat the Insular Celtic languages monolithically. In spite of the similarity of their overall typological profile, there are significant differences both between different languages of the group and between different stages of the same language. For example, while Old Irish has an largely prefixing morphology, Modern Irish is considerably more mixed. Similarly, Old Irish is highly synthetic, whereas Modern Irish has moved considerably towards an analytic type.

Some of the features outlined above have led a number of scholars to propose non-Indo-European influence on the Insular Celtic languages, with proposals of this nature already in the late nineteenth century. S. Hewitt (2009) gives an excellent overview of the grammatical features which have been discussed in this regard, although he considers them to derive from universal typological tendencies rather than language contact. While some researchers, notably Wagner (1959b; 1964) define the question in areal terms, more often scholars propose a substratum, usually Semitic (Morris-Jones 1899; Pokorny 1949), although others do not specify any genetic affiliation for the putative substrate language or languages (see Matasović 2012a; Mikhailova 2012; Matasović 2012b;). The dissertation of Gensler (1993) has reignited the debate in recent years by bringing modern techniques of cross-linguistic typology to bear on the question and arguing in favour of a Celtic-Semito-Hamitic language type. Opponents of the substratum hypothesis have at times been vehement in their denunciation of it (McCone 2006: 17-40; Isaac 2007a).

This subsection has given some preliminary information about the typological profile of Irish with reference to other languages of the world and to those within which it is in areal proximity. In contrast to this comparative viewpoint, the next subsection discusses the grammar of Irish in its own terms, laying out a model of prosodic constituency for the analysis of the language's morphology.

1.2.2. Morphology and prosodic constituency

While the previous subsection discussed salient features of Irish morphosyntax in comparative terms, in the context of the broader typological and areal linguistic literature, this subsection outlines rather a concrete model of prosodic constituency through which some of the most important features of Irish morphology can be analysed and understood. In comparison to the previous subsection, this entails a shift from the etic to the emic perspective, as a suitable model is already available in the native grammatical tradition.

A native Irish grammatical tradition can be identified already in the Old Irish period. However, notwithstanding the defence of the vernacular in Auraicept na nÉces (see 1.1.1), and a certain amount of original grammatical reflexion (see Ahlqvist 1974), this still hewed largely to the Graeco-Latin model. It is only in the Classical Irish period, from the twelfth century, that one can begin to see sui generis descriptions of the grammar of Irish, unencumbered by either the terminology or categories of the Graeco-Latin tradition.[20] The ensuing grammatical tradition has been preserved in a series of documents known as the *Irish grammatical tracts* (henceforth *IGT*), many of which were published by Bergin as supplements to the journal *Ériu* (Bergin 1916, 1923, 1928, 1946, 1955), to which Mac Cártaigh (2014) has recently provided a new edition. Further texts dealing with syntax, the *Bardic syntactical tracts* were published by McKenna (1944).

Although the grammatical model laid out in the *IGT* is designed for Classical Irish, it can be relatively easily adapted for other periods of the language. The remainder of this subsection concentrates specifically on the model of prosodic constituency outlined in the *IGT*, and adapts it to the Old Irish stage of the language.

The *IGT* identify a model of prosodic constituency roughly equivalent to what is generally referred to as a *phonological phrase* in linguistic work today. This is a prosodic domain defined by one primary nuclear stress, frequently written as a single word in Old Irish (Ahlqvist 1974). According to the *IGT*, this can be subdivided into up

[20] This is evidenced by the abandonment of the classical parts of speech; by the reemployment of the term *pearsa* 'person', borrowed from the Latin, with a meaning entirely different from that which it has in Latin grammar; by the development of the system outlined below for the analysis of clitic phenomena; and by many other particularities, some of which are discussed below. It should be noted, however, that these striking innovations in terms of the description of morphosyntax were not echoed in the description of phonology, which, judging by those documents which have come down to us, is sometimes novel in terms of its terminology, but rarely in terms of its analysis.

to three elements, termed *iairmbéarla*, *focal* and *barr*.[21] The *focal* is autosemantic and is capable of bearing primary lexical stress, while the *iairmbéarla* and *barr* are synsemantic and define unstressed proclitic and enclitic positions relative to the *focal* (Adams 1970). Each phonological phrase includes minimally a *focal*, but it need not necessarily have either an *iairmbéarla* or *barr*.

In reality, the picture is somewhat more complex than this, as it is possible for more than one proclitic element to precede the *focal*. A full model of the phonological phrase should then rather distinguish three constituents: an obligatory nuclear constituent, carrying primary stress and filled by a *focal*; an optional prenuclear constiutent, which may be filled by one or more *iairmbéarla* elements; and an optional postnuclear constituent which may only be filled by one of the *notae augentes*. This is outlined in the table below:

Table 1. The phonological phrase in Irish

Phonological phrase		
Prenuclear constituent *(Iairmbéarla)*	Nuclear constituent *Focal*	Postnuclear constituent *(Barr)*

In the Classical Irish period, and indeed probably also in the Old Irish period, the only element which could occur in the enclitic consituent was a member of the series of enclitics known as *notae augentes* in studies of Old Irish (*GOI*: §403-4), and generally known as emphatic particles in Modern Irish grammars (Mac Murchaidh 2006 257-9; Doyle 20038f.). The characterisation of these as having primarily emphatic or contrastive meaning is somewhat dubious for Modern Irish, and inaccurate for Old Irish, and discussions as to their function are ongoing (Eska 2009; Griffith 2008, 2011; Kern 2013).

In the prenuclear constituent of Old Irish articles, prepositions, possessives, forms of the copula, and verbal particles and preverbs can occur singly. Furthermore, it is not uncommon to find compound proclitics consisting of combinations of these, such as article plus preposition, copula plus possessive, or verbal particle plus infixed pronoun.[22] The composition of the prenuclear constituent in verbal phrases is dealt with in 4.2.1.

[21] Literally meaning 'hindspeech', 'word', and 'summit' respectively.
[22] Pronominal infixes cannot occur singly in the *iairmbéarla* position, but rather require a host, which may be any preverb, i.e. a prepositional preverb or conjunct particle. This is discussed in more detail in 4.2.1.

The nuclear constituent is obligatory, and contains a *focal*, which may be a noun, adjective, verb, adverb, or numeral. These are subject to inflexion: case and number for nouns and adjectives, and tense, voice, person, and number for verbs. In the case of verbs, there are also a series of suffix pronouns which may follow the inflected verb. The nuclear constituent in verbal phrases is discussed further in chapter 4, particularly in section 4.3.

The phonological phrase thus minimally consists of a nuclear constituent. Primary stress regularly falls on the first syllable of this constituent in Old Irish, and for the most part this holds true in subsequent periods of the language as well.[23] Proclitic and enclitic elements are typically considered to be unstressed (although see 4.2.1.2). The constituent parts of the phonological phrase are independent domains for the purposes of syncope and epenthesis, discussed in 3.3.2, and, at least in the Old Irish period, for assimilation, discussed in 3.3.3, as well.

The boundary between the prenuclear and nuclear constituents is of critical importance in Irish, as so-called *initial* consonant mutation occurs across this boundary. An *iairmbéarla*, or proclitic element, in the prenuclear constituent is a mutation trigger, while the initial consonant of the *focal* in the nuclear constituent is a mutation target. Consonant mutation involves a change in the phonological profile of the target consonant, for example, changing a stop into a fricative, or a lenis stop into a nasal etc. This is an extremely important phenomenon in all the Insular Celtic languages, and is discussed with reference to Old Irish in subsection 3.3.1.

This section has given an overview of some of the most salient features of Irish syntax and morphology, discussing them in typological and areal context, and providing a model, based on the native grammatical tradition, for their analysis. The next section turns back to phonology in order to introduce the main theme of this dissertation, namely consonant colour and vocalism in the history of Irish.

[23] There are occasional instances of historically compound adverbs in Modern Irish for which this generalisation does not apply. Furthermore, some varieties of southern Modern Irish shift the stress to a non-initial long vowel under certain conditions.

1.3. Consonant colour and vocalism in the history of Irish

This section examines approaches to the related questions of consonant colour and vocalism in the history of Irish. Subsection 1.3.1 discusses the various approaches to this question in the study of Old Irish, while subsection 1.3.2 explores the various perspectives on the topic in the study of Modern Irish.

1.3.1. Approaches to consonant colour and vocalism in Old Irish

This section examines approaches to consonant colour and vocalism in Old Irish. Subsection 1.3.1.1 introduces the topic and gives a literature review, while subsection 1.3.1.2 examines the terminological difficulties involved in discussions of Old Irish consonant colour. Subsection 1.3.1.3 concludes by comparing the three main approaches to consonant colour and vocalism in Old Irish, termed here the traditional, binary, and ternary approaches.

1.3.1.1. Consonant colour in Old Irish

Particular to all of the Goidelic languages throughout their historical development is a contrast in consonant colour that pervades the entire consonant system.[24] Consonant colour is the term given here to what is also known as secondary localisation, or secondary place of articulation, in the phonological literature, and is sometimes also referred to as consonant quality in works concerning the Goidelic languages.

There is no question that consonant colour is contrastive at all stages of the language, and indeed much of the inflexional morphology of the nominal system is based on differences in the colour of a final consonant, e.g. Mod. Ir. nominative singular *cat* /kat/ ‘cat’, but genitive singular and nominal plural *cait* /kat′/.[25] There is

[24] Depending on the analysis, /h/ may not contrast for consonant colour, and some analyses of Scottish Gaelic consider there to be no phonemic contrast in labials (Oftedal 1963; pace MacAulay 1962, 1966).
[25] Throughout this work, I use the prime after a consonant to indicate a fronted slender (Modern Irish) or i-colour (Old Irish) consonant, e.g. /C′/, and the degree sign after a consonant to indicate a rounded u-colour consonant (Old Irish only), e.g. /C°/.

widespread agreement that in Modern Irish there are two contrasting series of consonant colour, referred to here as *broad* and *slender*, and the Modern Irish situation is discussed further in 1.3.2, below.

The situation in Old Irish is less clear, and some scholars have described that stage of the language with reference to two contrasting series of consonant colour, and some with three contrasting series. These different approaches to the description of Old Irish consonants, and concomitant variance with respect to the description of the vowel system, are the subject of this subsection.

Discussion of consonant colour is absent in Zeuß (1853), except insofar as he discusses the historic development of vowels. Windisch (1879: 1, 4) does mention the two series of consonants found in Modern Irish, but does not say much about their status in Old Irish. The question is very briefly discussed by Ascoli (1891), who seems to argue that the contrast in colour is hosted by the vowels, rather than the consonants. It is only during the great flowering of Celtic scholarship at the turn of the nineteenth and twentieth centuries that consonant colour comes to be discussed in detail.

The early twentieth century descriptions of Old Irish (Vendryes 1908: 20-23; Thurneysen 1909: §157; O'Connell 1912: §19; Pokorny 1913: §35; Thurneysen 1946: §157) all concur in describing three distinct consonant colours for that stage of the language, termed here *i-colour*, *a-colour*, and *u-colour*. This basic analysis was accepted by Martinet (1955: 199ff.) and persisted as late as the 1970s, for example in the grammar of Lehmann and Lehmann (1975: 8).[26] I refer to it in what follows as the *traditional approach*, and it is worth briefly outlining the terminology these scholars used to discuss consonant colour.

Thurneysen (1909: §80, §153-4) discusses consonant "colouring",[27] with the three categories of "palatal", "dark",[28] and "u-coloured". The English translation of Thurneysen's grammar (*GOI*: 1946) uses the term "quality" rather than "colouring", and describes consonants as being either "palatal", "neutral", or of "u-quality" (*GOI*: §156-7). It is impossible to know if the translation of "dark" as "neutral" was a conscious revision on the part of the author before his death in 1940, or a choice made by his translators, Binchy and Bergin.

[26] One occasionally finds references to a three-way distinction in later sources as well, although always presented without commentary (e.g. Thomson 1984: 244).
[27] In the original *Färbung*.
[28] In the original *dunkel*.

Careful comparison of the texts throws up further inconsistencies. The 1946 translation explicitly states that the phonetic u-colour observed in Modern Irish broad labials is not a survival of the Old Irish u-colour (§156), but this observation is missing in the 1909 version (§153). Furthermore, the 1946 text describes how "|in the course of time neutral consonants also came to be pronounced with the back of the tongue raised", presenting this as bringing them closer in articulation to the u-colour consonants and thus precipitating the loss of the latter (§174). This passage is missing from the corresponding paragraph (§172) of the 1909 text and indeed the use of the adjective "dark" for a-colour in the earlier text already suggests some manner of back resonance. Again, it cannot be determined if these were (possibly incomplete) revisions made by Thurneysen himself before his death, or if they were inserted into the text during the process of translation.

Among the other early descriptions, Pedersen (1909: §235ff.) uses the terms "softening" and "rounding" with reference to i-colour and u-colour. For his part, Pokorny speaks of consonant "quality" and uses the terms "palatal", "broad" (or "neutral"), and "rounded" (1913: §35). O'Connell's practice is similar, with consonant "quality" as the cover term and "palatal", "neutral" and "velar" as the three distinct colours (1912: §19).

It is, however, in the work of Vendryes that the issue of consonant colour is most explicitly discussed,[29] and the problems most clearly stated. In a remarkably clear, although seemingly largely forgotten, paper (Vendryes 1906), he differentiates the orthographic and phonological issues at issue with regard to consonant colour and the related, but distinct, question of height alternations in vowels.

In the view of Vendryes, there is a three-way contrast in the consonants of Old Irish: they may be front, as before <i> and <e>; middle, when preceding <a> or <o> or; back, when <u> follows (1906: 393). He gives as examples the words *tír* 'land', *tál* 'axe' and *tús* 'start', where the <t> is front in the first word, middle in the second, and

[29] Thurneysen, Pokorny, Pedersen, and the other scholars working on Old Irish in the earlier twentieth century belonged firmly to the historical comparative tradition, but although Vendryes studied under Thurneysen in Freiburg i. Breisgau, he was already something of a structuralist avant la lettre. His grammar is the first work of which I am aware to use the term "phoneme" in relation to the Irish language (Vendreyes 1908: 11). His 1906 paper, which is written with great terminological clarity, is the most thorough treatment of this structural property of Old Irish from the period, and comes close to anticipating some of the analysis presented below. Given its terminological clarity, and the enthusiasm and certainty with which consonant colour is described in his 1908 grammar, it is tempting to see what I call the traditional approach to Old Irish consonant colour as the work of the student, rather than the master.

back in the third. This claim regarding Old Irish consonants is repeated in his Grammar, which maintains the same terminology and speaks of the "value"[30] of the consonants (Vendryes 1908: §20, §30).

Distinct from this, Vendryes defines vowel "infection" as both a phonetic and orthographic principle; phonetic to the extent that the colour of a consonant has an affect on the quality of surrounding vowels, and orthographic to the extent that this is shown in Old Irish spelling (Vendryes 1906: 394-6). Further to "value" and "infection", he identifies "metaphony" as an historically conditioned series of height alternations in vowels induced by the vowels of following syllables (ibid: 396ff.). He notes (ibid: 397) that it also frequently applies to Latin loans, even when borrowed "après l'action de la loi de métaphonie".[31]

By and large, the terminology outlined by Vendryes is followed in this work, with some alteration. Given this profusion of terms used to describe the phenomena at hand, however, and occasional confusion over what, exactly, is being discussed, it is worth defining terms quite carefully. This is carried out in the following subsection.

1.3.1.2. Terminology

Throughout this work, I use the term *colour* for the "value" of Vendryes. This echoes the historic use of the chromatic metaphor for this phenomenon, as evidenced by Thurneysen's (1909) use of the term *Färbung*, and Martinet's (1955: 199) *coloration*. However, it also acknowledges the more recent employment of the chromatic metaphor for the analysis of vowel systems in work such as Donegan (1978). Consonant colour is a contrastive property of consonants at the synchronic level.

Also at the synchronic level (pace Vendryes 1906 and Martinet 1955: 200ff.), I identify a principle of *metaphony* at work in Old Irish. This refers to the conditioning of surface vowel height by surrounding consonants, and in particular to the neutralisation of vowels to /a/ before an a-colour consonant. This is dealt with further in 3.3.3.3. Metaphony of this nature is automatic, but in some cases a certain vowel must be considered the phonological exponent of a given morphological category, e.g. the

[30] In the original *valeur*.
[31] After the action of the law of metaphony.

accusative singular of ā-stem nouns. For these cases, where the vowel alternation is determined by morphological, not phonological, criteria, the term *ablaut* is used instead. Metaphony results from the action of a type of vowel height harmony in the prehistory of Old Irish (Jaskuła 2006: 176ff.) for which the traditional terms "lowering" and "raising" (*GOI*: §73-9; Kortlandt 1979: 11, 15f.; McCone 1996: 110ff.) are used in this work.

For the effect of consonant colour on vowel timbre, rather than vowel height, i.e. what Lewis and Pedersen (1937: 102ff.) describe as i-umlaut and u-umlaut, I use the term vowel *infection*. Martinet (1955) is correct to identify this as a diachronic process, but it is one that has continued to operate throughout the history of Irish, and accounts for differences in surface vocalism between Old Irish and Modern Irish, as well as between modern varieties of Goidelic (see de Búrca 1979). Although this phenomenon is most visible with vowels, there are also cases of consonant infection, whereby surface vowel timbre induces a change in consonant colour, e.g. historical *tuit* 'falls' with an initial u-colour or later broad consonant, but Modern Irish *tit*, with an initial slender consonant (ibid).

Lastly, it is necessary to identify an orthographic principle, for which the term vowel *affection* is used in this work. This refers to the frequent use of symbols which are ordinarily used to represent vowel sounds to mark the presence of a certain consonant colour in a following (or less often preceding) consonant. Thus, the vowel <i> in Modern Irish *file* 'poet' represents a vowel which is relatively high and front on the surface, but the <i> in Modern Irish *cait* 'cats' is merely a graphic means of indicating that the following consonant is slender, not broad. Similary, the first vowels in Modern Irish *buí* 'yellow' and *beo* 'alive' serve only to indicate an initial broad and slender consonant respectively, thus successfully differentiating these graphically from *bí* 'be' and *bó* 'cow'. The extra vowel symbols in these examples, i.e. <i> in the first, <u> in the second, and <e> in the third, are orthographic vowels of affection. The fact that there may be an audible glide between vowel and consonant or consonant and vowel in these contexts is not due to the underlying presence of a glide consonant or even a second vowel, but is simply and purely the phonetic exponence of consonant colour in a given phonological context, i.e. the *infection* of the vowel by the consonant. Failure to differentiate the orthographic and phonological principles at work in this regard has led to a string of misapprehensions throughout the history of Irish phonology.

Having defined the necessary terminology for the discussion of consonant colour and vocalism in Old Irish, the next subsection turns to the different approaches to Old Irish consonant colour found in the linguistic literature. These are termed the traditional, binary, and ternary approaches in what follows, and are outlined one by one in the next subsection.

1.3.1.3. Traditional, binary, and ternary approaches

Implicit to all descriptions written from the traditional approach is the assumption of a five member short vowel system, /i e a o u/[32] in the Old Irish period. Accounts of long vowels and diphthongs vary somewhat, but Thurneysen's grammar is not atypical in positing six or seven distinct long vowels /iː eː ɛː aː (ɔː) oː~ua uː/ and five diphthongs /ai~oi ui au eu iu/. Although the current approach, discussed briefly below, laid out in detail in chapter 3, and implemented to the verbal system in chapters 5 and 6, agrees with the traditional approach in positing three distinct consonant colours, it drastically reduces the vowel system to only two members, /a/ and /ə/, while introducing three new *abstract* consonants – a-colour /∅/, i-colour /∅′/, and u-colour /∅˚/ – to deal with initial, final, and long vowels. This reanalysis is based to a large extent on a recognition that the vowels posited in the ternary account are in complementary distribution.

Although the traditional twentieth century descriptions are in accord with respect to the existence of three consonant colours in Old Irish, they differ in which positions they consider these different colours to occur. For Vendryes (1908: §20) and Thurneysen (1909: §157)[33] the i-colour occurs before <i e>, the a-colour before <a o>, and the u-colour before <u>. For Pokorny (1913: §35), a consonant followed by <o> is rounded, i.e. it has u-colour. In the vast majority of cases, and particularly with respect

[32] I use slanted brackets here with a qualification. The earliest twentieth century scholars who discussed this question were, with the partial exception of Vendryes, traditional historical-comparative linguists, concerned primarily with diachronic developments rather than synchronic systems. That being the case, basic structuralist principles such as complementary distribution were not relevant to them, and there is no evidence that any of them distinguished between more abstract and concrete levels of description. This caveat about slanted brackets obviously does not apply to a structuralist of the calibre of Martinet, who wrote about this topic in 1955, but failed to mention the consequences for the vowel system of positing three distinct series of consonant colour.

[33] Also for O'Connell (1912: §19).

to stressed syllables, the analysis put forward here agrees with Pokorny on this point, as should be clear from the discussion of Old Irish phonology in 3.2, and orthography in 3.1.

The three-way view of Old Irish consonant colour, like long-standing assumptions in many fields, came to be challenged in the 1960s. David Greene (1962) argues explicitly in favour of only two consonant colours for Old Irish, while Sommerfelt (1963) also only recognises broad and slender consonants, making no reference to a third consonant colour. Over time, Greene's analysis of Old Irish consonant colour, supplemented by further important papers on Old Irish historical phonology (1973, 1976), became the mainstream view. It is implicit in the relative chronologies of Kortlandt (1979) and McCone (1996), and is the view put forward in recent didactic material as well (e.g. McCone 2005: 15f.; Stifter 2006: 15ff.). In what follows, I describe the approach to Old Irish phonology that recognises only two distinct consonant colours in the language as the *binary* approach.

Greene (1962) presents four main arguments against the existence of three distinct consonant colours in Old Irish: 1) a three-way consonant colour distinction is typologically less common than a two-way distinction; 2) the orthography does not support the independent existence of a series of u-colour consonants; 3) the purported u-colour has minimal functional load in terms of the discrimination of morphological forms, and; 4) an analysis with two consonant colours is more phonologically parsimonious. These arguments do not stand up to serious scrutiny and have been challenged in detail by this author elsewhere (C. Anderson 2014a; 2014b). They are however, briefly addressed here as well.

The typological argument is particularly suspect. Greene (1962: 622) claims that a three-way distinction in consonant colour, such as that previously argued for Old Irish, is "very rare in any language" and that a two-way distinction, such as that pertaining in Modern Irish or Russian, is the norm for languages with such a distinction. A considerable quantity of typologically orientated research in phonology has taken place since the publication of Greene's paper and grammatical descriptions of far more languages are available to the contemporary phonologist than were to his peer in the mid-twentieth century. It is possible, even likely, that, as Greene claims, a two-way contrast in consonant colour is more common in the languages of the world than a three-way one. However, this in itself is insufficient grounds to argue that Old Irish must have only had two distinct consonant colours.

Numerous counter-examples of languages with a three-way distinction in consonant colour are put forward in the survey of languages with minimal vowel systems in chapter 2, below, but it should be noted that the a three-way distinction in consonant colour does not require or necessarily cooccur with a minimal vowel system. Examples can be found in numerous unrelated families around the world, including in in Atlantic-Congo languages (e.g. Bouquiaux 1970 for Berom; Nettle 1998 for Fyem), in Micronesian languages (e.g. Lee 1975 for Kosraean), in Semitic languages (e.g. McCarthy 1983 for Chaha; pace Banksira 2000; Younansardaroud 2001 for the Särdä:rïd dialect of Eastern Neo-Aramaic; many Arabic dialects in the analysis of Bellem 2007). Even without going so far afield, Scottish Gaelic is generally analysed as having a three-way distinction in colour for sonorants.

Of Greene's other arguments, that of that of morphological distinctiveness, for which he states "while the semantic load of palatalisation is enormous, that of the alleged velarisation is very light" (Greene 1962), is open to critique. While it is true that a-colour and i-colour are more frequent exponents of morphological categories than u-colour, Greene underestimates its importance (C. Anderson 2014a: 15-20). A number of important flexional categories have final u-colour as their exponent, such as the dative singular for many masculine nouns, and the first person singular for a large number of verbs.

My paper on this subject (ibid) argues that the written record of Old Irish generally constitutes informational rather than involved production, in the sense distinguished by Biber (1988). These two types of production differ fundamentally in the grammatical features they tend to utilise. Informational production is impersonal, more formal, and generally associated with the written word, whereas involved production is more personal and informal and is associated with the spoken word. The Old Irish glosses, which are our primary sources for Old Irish grammar, are a canonical example of informational production, being, as they are, designed to elucidate or expand on the original Latin text. That being the case, we would expect to find a preponderance of third person verbal forms and a paucity of first and second person forms in this corpus.

The data from my study (C. Anderson 2014a: 21) show that over half of the 2156 active verbal forms in the Würzburg glosses are in the third person singular (53.8%) and that the next most frequent person-number category is the third person plural (14.3%). In total, only 10.4% of active verbal forms in Würzburg are first person

singular forms, and 40% of these rely on u-colour consonance to disambiguate them from other verbal forms.

The orthographic argument is very much dependent on the overall analysis of the phonology, and is discussed further in 3.3. Greene tends to discuss the u-colour as something which occurs mainly in codas, particularly in the codas of stressed and/or final syllables, whereas in the understanding of scholars who took the traditional approach, and in the analysis laid out here, u-colour occurs equally in the syllable onset.[34]

The argument of phonological economy put forward by Greene for a binary distinction in consonant colour is somewhat more complex. One consequence of the reduction of consonant colours from three to two in the binary approach is an increase in the number of vowels posited for the language. In what can be considered the typical exposition of this view, McCone (2005: 15-17) claims that there are five phonemic short vowels and three phonemic short diphthongs in Old Irish, viz. /i e a o u iu eu au/. The reason for the addition of these three short diphthongs is that the difference between forms such as nom. sg. *nert* 'strength' and dat. sg. *neurt*, can no longer be attributed to a difference between a-quality and u-quality in the final consonant, as this contrast not taken to exist in the binary approach. Instead, a phonemic contrast between /e/ and /eu/ is posited, and pari passu for /i/ and /iu/, and /a/ and /au/.[35]

From a perspective which sees phonological economy purely in terms of the number of phonemes, the binary approach is indeed more economical than the traditional approach. Stifter (2006: 15-16) counts over 100 phonemes in Old Irish under the traditional approach.[36] In contrast, the binary approach has 66 phonemes: 42 consonants, 11 simple vowels and 13 diphthongs. Although the approach espoused here does not privilege the phoneme as a unit of analysis, translating it into phonemic terms yields 68 phonemes: 66 consonants and only 2 vowels.

However, parsimony in phonological description is about more than just a brute count of phonemes. If that were the case, such descriptions could be written in binary

[34] There is some evidence that u-colour is associated primarily with word edges. See 3.1.3 for further discussion of this point.

[35] This aspect of the analysis is disputed by Jaskuła (2006: 198ff.), who argues that the difference between <i> and <iu> is orthographic, and consequently that Old Irish can be described as having a two-way distinction in consonant colour and five phonemic vowels.

[36] This includes phonemic geminate obstruents. Were these to be disregarded, this number would drop to 90.

code. Depending on one's perspective, distributional and substantive considerations are also important. Both the traditional approach and the binary approach hide a severe distributional anomaly: in initial position consonant colour and vowel timbre are entirely codependent. Attributing the functional load of phonological contrast to the vowel, McCone (2005: 15) notes that "being quite automatic, the distinction between palatal and non-palatal initial consonants was non-phonemic [in Old Irish]".

This formulation is quite problematic. As the onset of the initial syllable of a stressed word is typically the site of the primary stress in Old Irish, one would expect it to be more rather than less preferred as a site for phonemic contrast. One might argue that this is especially the case in a language such as Old Irish, where the initial consonant carries a lot of morphological information, being as it is susceptible to mutation. Positing a two-member minimal vowel system for Old Irish, alongside a ternary contrast in consonant colour resolves this distributional anomaly. This is the *ternary* approach I argue for throughout this work, and is discussed and defended in following chapters.

A final note on the debates around consonant colour in Old Irish concerns challenges to the binary approach in recent years. I first presented my thoughts on the ternary system at the fourteenth International Congress of Celtic Studies in Maynooth in the summer of 2011. At the same Congress, Kim McCone, who until then had always argued in favour of a binary distinction in consonant colour in Old Irish, gave a plenary lecture suggesting that there might have been a ternary distinction in consonant quality in the language after all. McCone's lecture seemed to be broadly based on Pokorny (1913: §61-63) with some innovations of his own. Later, I became aware that Hans Heinrich Hock had also taken up this theme, arguing in favour of three consonant colours in Old Irish first at the annual meeting of the Societas Linguistica Europaea in Lisbon in 2009 (Hock 2009), and then again at the International Congress of Historical Linguistics in Naples in the summer of 2015 (Hock 2015).

It thus appears that McCone, Hock, and myself independently began to question the binary approach to Old Irish consonant colour at around the same time. McCone's contribution from the congress in Maynooth was published in 2015 (McCone 2015) and my own thoughts on the question saw the light of day in two separate publications the

previous year (C. Anderson 2014a; 2014b).[37] To my knowledge, neither Hock nor McCone discuss the consequences of a three-way distinction in consonant colour for the vowel system, and thus are in effect arguing for a return to the traditional approach, while my own contributions, in arguing that Old Irish had a minimal short vowel system of only two members, are an early version of the ternary approach.[38] A reflection on the challenge to the binary system by myself and McCone, and the differences between our approaches, is given by Jaskuła (2014).

This subsection has laid out the various approaches to consonant colour in the history of Old Irish scholarship. As well as identifying three main approaches, labelled *traditional*, *binary*, and *ternary*, it outlined some of the key terminology used to discuss the topic. The theme of consonant colour in Old Irish will be returned to in chapter 3, where the orthography (3.1) static phonology (3.2) of the language are discussed in more detail. The next subsection examines rather the various approaches to consonant colour, and especially vocalism, in Modern Irish.

1.3.2. Approaches to consonant colour and vocalism in Modern Irish

This subsection turns from Old Irish to Modern Irish and other Goidelic varieties, with the aim of identifying the approaches to consonant colour and vocalism to be found in the linguistic literature concerned with those languages. As may be seen in what

[37] After the conference in Maynooth in the summer of 2011, I submitted my paper to a newly-formed journal of Celtic Studies, *Res Celtica*, in Poznań, where I was then a doctoral student. A little later, I was invited by David Stifter to submit to a book he was preparing from the papers on Early Irish that had been presented at the congress in Maynooth, and I accepted. As the paper I had prepared on the topic was too long, I had initially thought to split it in two, with one paper giving an overview of the ternary approach, and a second one concentrating more on morphological questions, explicitly challenging Greene (1962). The paper for the book (Stifter and Roma 2014) underwent peer review and was revised considerably in the light of comments from reviewers and my own changing thoughts on the topic. I attempted to mould it into a general overview of the ternary approach as I understood it at the time and after substantial revision it saw publication (C. Anderson 2014b). In the meantime, the publication of *Res Celtica* ran into difficulties, and in the absence of any communication with the editors, I presumed that it would never see the light of day. It was to my great surprise that I learned it had been published in the summer of 2014. My contribution there (C. Anderson 2014a) contains material on the frequency of morphological forms in Old Irish and extra discussion that is absent from its sister paper (C. Anderson 2014b), but is, I think, considerably less polished in terms of language and argumentation. An unfortunate consequence of the fact that I was neither able to revise my paper for *Res Celtica*, nor to approve the proofs before publication, is that both papers have the same name, although they differ somewhat in content, and considerably in terms of language.

[38] In the papers cited, I had not yet developed an analysis of long vowels, initial vowels, or final vowels, and discussed primarily the situation in stressed syllables.

follows, the debate on this topic with respect to modern Goidelic varieties is quite different to that with respect to Old Irish. There is more agreement about the status of consonant colour in modern varieties, but there has been considerable debate about the size and nature of the vowel systems of said varieties. Subsection 1.3.2.1 summarises views on consonant colour in Modern Irish, while subsection 1.3.2.2 examines rather approaches to describing the vowel systems of contemporary Goidelic varieties.

1.3.2.1. Consonant colour in Modern Irish

The situation with respect to consonant colour in Modern Irish is a great deal more straightforward. As far as I am aware, all descriptions of the language consider it to have two distinct consonant colours. This section is thus focused more on the various approaches to analysing the vowel system, a topic which is considerably more problematic and has engendered significantly more debate. Some remarks on consonant colour are, however, necessary first.

In a paper examining the terminology used for the two series (Gleasure 1968: 80) argues that the terms "palatalised" and "velarised" are "dangerously ambiguous, or, at least, susceptible to misinterpretation", as they can be used at both the phonetic and phonemic level. He seems sympathetic to Sommerfelt, who had begun to use the Jakobsonian terms "sharp" and "plain", and mentions Trubetzkoy's use of "palatal" and "non-palatal", before coming out in favour of the terms used in the native grammatical tradition, i.e. *caol* 'slender' and *leathan* 'broad' (*IGT* I: 1f.). The English version of these terms are used throughout this work as well.

There are good arguments against using terms such as *sharp* and *plain*, *palatal* and *non-palatal*, as they imply that one member of the pair is marked with respect to the other. Gleasure (1968: 82f.) shows that the degree of phonetic palatalisation of slender consonants, and the degree of velarisation of broad consonants, is conditioned by context. Broadly speaking, slender consonants are more robustly palatalised before back vowels, while broad consonants are more robustly velarised (or labialised) before front vowels. At the phonetic level, it is thus difficult to argue that the broad series is in any way more *plain* or unmarked than the slender one (Ní Chiosáin and Padgett 2001; Bennett et al. 2014; pace Iosad and Ní Chiosáin 2016).

In terms of phonological behaviour, there is little to suggest that the broad series is somehow basic or unmarked, and it is only in terms of frequency that one might argue in favour of a marked slender series. However, although the slender series is, as a whole, less frequent than the broad one, there is wide variation between the various consonant pairs, and positional considerations are also relevant, as my own research has shown (C. Anderson 2013; Anderson and Jaworski 2015).

In spite of these terminological disputes, however, there is widespread agreement that the varieties of Modern Irish contrast two consonant colours, traditionally termed slender and broad. The main phonetic exponent of the former is typically palatalisation, while the exponents of the latter include velarisation and, with its occurrence depending considerably on dialect and phonological context, also labialisation. This statement of the facts is highly reminiscent of the common front-back distinction often found in vowel systems and is consistent with a phonological contrast grounded firmly in differences in the second formant (see 3.2.1.4).

While at least this aspect of Irish consonantism is relatively uncontroversial, vocalism has engendered more controversy, and conflicting statements can be found in the relevant literature. Broadly speaking, descriptions from the first half of the twentieth century, which were not phonemic, describe a large number of short vowels, while the canonical phonemic descriptions from the middle of the century describe five or six. In the second half of the twentieth century, many descriptions of Modern Irish, particularly within the generative tradition, describe it as having a vertical short vowel system, although this has not met with universal acceptance. The remainder of this subsection discusses the vocalism of Modern Irish varieties in more detail.

1.3.2.2. The vowel systems of Modern Irish varieties

The early dialect studies of Modern Irish (Henebry 1898; Finck 1899; Quiggin 1906; Sommerfelt 1922a; Sjostedt-Jonval 1938) describe a large number of phonetic vowels. However, these descriptions were not phonemic, and pay no heed to the question of complementary distribution. From the 1930s, the need for further and more comprehensive dialect descriptions was becoming apparent (Ó Máille 1936; see also Baumgarten and Sommerfelt 1971) and this fell firmly within the remit of the new School of Celtic Studies at the Dublin Institute of Advanced Studies (Ó Murchú 1990).

In need of someone to train researchers to investigate the Irish dialects, an appeal was made to University College London in 1940, and to Daniel Jones in particular. He sent Eileen Evans, later Eileen Whitley, from London to supervise phonetic training of the dialect researchers, and this took place in 1941 and 1942 (J. Kelly 2005: 94f.). Her students were Brian Ó Cuív, Tomás de Bhaldraithe, Risteard Breatnach, and Éamonn Mhac an Fhailigh, authors of the canonical descriptions of the dialects of West Muskerry (Ó Cuív 1944), Cois Fhairrge (de Bhaldraithe 1945), Ring (Breatnach 1947), and Erris (Mhac an Fhailigh 1968), all of which are, unsurprisingly, very much in the style of Daniel Jones. They will be returned to in a moment, but something more should first be said about Eileen Whitley, whose work, in stark contrast to that of her students, appears to have been almost entirely forgotten.

During her period in Ireland, Whitley undertook fieldwork in Kerry, but was recalled suddenly to London in 1942, where she took up a post at the School of Oriental and African Studies (SOAS) under J. R. Firth, her erstwhile colleague at University College London. J. Kelly (2005: 122) notes that she expressed her reservations about the applicability of the phoneme concept to Daniel Jones, whose book *The phoneme, its nature and use* (Jones 1950), contains no examples from Irish, despite his ready access to them. At SOAS, Whitley came under the influence of Firthian prosodic analysis, and her work in Irish is firmly in that vein.

The only remnants of Whitley's work on Irish of which I am aware are preserved at the Firthian Phonology Archive in York, along with some notes by her students. Two handouts (Whitley 1959a; 1959b) give a prosodic analysis of the Modern Irish noun piece. Three prosodies, indicated with the letters X, Y, and Z, are written below the line, while phonematic units are written above the line. She represents vowels as either V or /ə/, but unfortunately no analysis of the vocalic system is given. However, a scribbled note in John Kelly's hand (J. Kelly 1969), also kept preserved in the archive, testifies to the fact that she had developed an analysis of the Modern Irish vowel system as having only three members by that time, and probably already in the 1950s.

Being unpublished, Whitley's work failed to garner any attention in future studies of Irish phonology, but the same cannot be said of her students, whose works became canonical reference descriptions for the dialects they covered. Written using a quite concrete phonemic approach, in the style of Daniel Jones, they all describe five or six full short vowels.

With respect to the Munster varieties, Ó Cuív (1944: 15ff.) describes the Irish of West Muskerry, Co. Cork, as having /i e a ɑ o u/, as well as /ə/, although he remarks that "some of them are very close to one another in quality [...] since the toungue-raising necessary for palatalized or velarized qualities in consonants influences the tongue-raising for neighbouring vowels" (ibid: 13). Breatnach's study of the Irish of Ring, Co. Waterford (1947: 5ff.) lists five full short vowels, /i e a o u/, as well as /ə/, but recognises overlaps in their distribution. He notes that "where a vowel is preceded by a palatal and followed by a non-palatal it is sometimes difficult to decide whether a speaker is using an advanced variety of /u/ or a retracted variety of /i/" (ibid: 7) and "in many cases in which /e/ is preceded by a non-palatal and followed by a palatal, /o/ is an alternative" (ibid: 10). He also remarks that "/o/ and /u/ are interchangeable in a number of words" (ibid: 13).

Turning to the Connacht varieties, in de Bhaldraithe's (1945: 9ff.) work on the Irish of Cois Fhairrge in Co. Galway, six short vowels, /i e æ a o u/, are described, but the two low vowels, /æ/ and /a/, have a very restricted distribution. He notes that "/i/ is sometimes replaced by /u/" (ibid: 10) and "/e/ is sometimes replaced by the second member of the /o/ phoneme" (ibid: 12). Mhac an Fhailigh (1968: 9ff.) describes five short vowels, /i e a o u/, as well as /ə/, for the Irish of Erris in Co. Mayo. In certain contexts, he describes alternation between /e/ and /o/ (ibid: 13), and between /i/ and /u/ (ibid: 18).

Although Seán de Búrca was not a student of Whitley, his description of the Irish of Tourmakeady in Co. Mayo is directly comparable to the other dialect descriptions under discussion here. He describes five short vowels for his dialect (de Búrca 1958: 7ff.), /i e a o u/, as well as /ə/. He explicitly notes the lack of minimal pairs betwen the high and mid vowels and states that "overlapping of /i/ and /u/, and of /e/ and /o/, tends to occur between consonants of opposing quality" and that "the variety of vowel in almost every case agrees with the consonant immediately following it" (ibid:9).

The hedges and caveats given in the descriptions above point to a fundamental difficulty in these five and six vowel analyses. The allophones of the non-low phonemes

overlap to such a degree that it becomes impossible determine whether a given phone is a retracted exponent of a front vowel phoneme or an advanced exponent of a back vowel phoneme. The confusion arises in contexts in which the preceding and following consonants are of a different colour. This begs the question whether these front-back pairs might actually be in complementary distribution.

The question of the synchronic phonology of short vowels across the Goidelic dialects is discussed in detail by Ó Maolalaigh (1997: 87ff.). From the 1960s onwards, broadly structuralist accounts of Modern Irish dialect phonology began to recognise the complementary distribution first of the high vowels (Holmer 1962), implying a system with four vowels, and a little later of both the high and mid vowels (Skerrett 1967; Bliss 1972),[39] implying a vertical short vowel system with three vowels, /a ə ɨ/, the allophones of which are conditioned by the consonantal environment.

Ó Maolalaigh (1997: 99ff.) conducts an in-depth analysis of the three vowel system on the basis of the corpus developed by de Bhaldraithe for his description of the Irish of Cois Fhairrge in Co. Galway. He concludes (ibid: 108) that there is "very good evidence indeed for the lack of a front-back contrast in high and mid and low short vowels in the dialect". Broadly speaking, at least as regards the high vowels, in the most contentious environment between a slender and broad consonant a fronted allophone [i] is found before coronals, while a retracted allophone [u] is found before other consonants.

Interestingly, this complementary distribution finds a parallel in Old Irish orthography, discussed further in 3.1. In Old Irish, <iu> is the usual way of writing a stressed high vowel between i-colour and u-colour consonants. However, when the following consonant is a coronal other than /r˚/, <i> is frequently found instead. This suggests that in Old Irish and Modern Irish both, the i-colour of the initial consonant extends through more of the vowel when the following consonant is a coronal than when it is not. Put otherwise, the chromatic transition from i-colour to u-colour, or broad resonance as the case may be, occurs relatively later when the following consonant is coronal.

The postulate of a vertical vowel system with three members for Modern Irish was largely accepted by scholars working in the generativist tradition. It is repeated in

[39] The absence of minimal pairs between front and back high and mid vowels had already been noticed by de Búrca (1958), as mentioned above.

the SPE-style account of Ó Siadhail and Wigger (1975) and in Ó Siadhail's later (1989) work on Irish dialects. Ní Chiosáin (1991) is a feature geometry account of Irish phonology, which operates with three underspecified vowels whose front-back features are filled in by surrounding consonants. Cyran (1997: 23ff.), in his discussion of the phonology of Munster Irish, also postulates a vertical vowel system of three members couched in element theory, with the {I} and {U} resonance elements of surrounding consonants filling an empty element {_} for the high and mid vowels.[40] Cléirigh's account of Irish phonology is outside the generativist tradition, drawing as it does on Halliday's systemic functional linguistics, and thus ultimately within the broader Firthian tradition. However, he too postulates a three-way contrast in short vowels in Modern Irish (Cléirigh 1998: 144ff.).

Acceptance of a short vertical vowel system has not been universal however. Ó Sé (1982: 31f.) explicitly rejects it in his account of the Irish of Corca Dhuibhne in Co. Kerry. However, Ó Maolalaigh (1997: 96ff.) examines Ó Sé's corpus and argues that front and back vowels can indeed be seen to be in complementary distribution. Hickey, examining the Connacht varieties in particular (1986) and Irish dialects more generally (2012), holds that /o/ and /u/ are in complementary distribution, and that the Irish short vowel system can thus be reduced to /i e a o/.

More recently, Iosad and Ní Chiosáin (2016) conducted an acoustic study on the vowel systems of two native Irish speakers. Their preliminary findings were that front and back vowels were largely in complementary distribution, and that the effect of surrounding consonant localisation was significant, but, they argue, insufficient to account fully for the front-back distinction. They argue in favour of five surface categories of short vowel[41] and argue that the complementary distribution observed in varieties of Modern Irish results from the historically contingent distribution of vowels in the lexicon.

More research in this field is clearly necessary. The structuralist accounts of Irish dialects were descriptions of western and southern varieties of the language and most of the work on northern varieties consisted in "phonetic studies of individual dialects, [and] could be classified as non-structuralist and in some cases deliberately

[40] This account has the advantage of explaining why less phonetic variation is observed in quality of the low vowel vis à vis the mid and high vowels.

[41] They suggest that "front and back non-low vowels are 'quasi-phonemes' (Janda 2003; Kiparsky 2015): *distinctive* but *non-contrastive*".

anti-structuralist" (Ó Maolalaigh 1997: 109). Despite Ó Maolalaigh's ensuing discussion (ibid: 111ff.), it is probably safe to say that the vowel systems of northern varieties are less clearly understood, and may well not be uniform.

The only vertical short vowel analysis of Scottish Gaelic of which I am aware is that of McConville (2013). More frequently, varieties of Scottish Gaelic are described as having between seven and ten short vowels, although Ó Maolalaigh (1997: 132ff.) notes that some of these vowels, particularly those defined by the high-mid and low-mid opposition, are in complementary distribution. I am not aware of any vertical short vowel analysis for Manx, although that language is comparatively poorly studied in comparison to other varieties of Goidelic.

All in all, one can establish a cline across the Goidelic speaking area, with the postulate of a vertical short vowel system well-established for southern and western varieties of Irish, much less so for northern ones, and very much a minority view for Scottish Gaelic. There is also something of a cleavage between those researchers more inclined to admit a degree of abstraction in phonological analysis, who generally favour the vertical vowel analysis, and those more focused on phonetic substance, who don't. The former group unites scholars working in the otherwise quite distinct Firthian and generativist traditions, as well as Ó Maolalaigh, whose PhD dissertation on the topic (1997) is not explicitly theoretical, but is phrased in the language of a relatively sophisticated latter-day structuralism. The latter group comprises both the structuralists working in the Jonesian tradition,[42] and scholars more focused primarily or exclusively on phonetic content, including anti-structuralist dialectologists such as Wagner (1959a),[43] as well as later researchers with a more physicalist[44] understanding of the nature of the phoneme (e.g. Ó Murchú 1969; Hickey 2012).[45]

[42] Although de Búrca's description of the Irish of Tourmakeady is written in a broadly Jonesian vein, it is clear from both his bibliography and his analysis that he was well aware the broader currents in European and American structuralism. It is no coincidence that it was he, and not one of the other authors of the dialect monographs, who recognised the complementary distribution of the high and mid vowels.

[43] In an otherwise admiring review of Wagner's grammar of Teilinn Irish (1959a), de Búrca, shows a certain exasperation with Wagner's rejection of the phonemic principle: "consistent with his exclusion of the phonemic concept, he maintains his notation at the phonetic level throughout, indefatigably pursuing the vagrant realizations". He considers that "phonemicization (subsuming the phonetic level) would yield a neater and - I think - a better presentation of the material" (de Búrca 1960b: 451f.).

[44] Used here in the sense of Twaddell (1935).

[45] In Jakobson and Halle's discussion of the phoneme concept (1956) the practice of Jones is considered to constitute a distinct "generic" approach, while Twaddell (1935) considers him a "physicalist", alongside Bloomfield and others. I cannot agree with Vachek (1935: 250) that the practical and theoretical approaches of Jones and the Prague School were identical, nor with Jones himself, who sees the work of Bloomfield and Trubetzkoy as being practically equivalent (Jones 1950: 215f.). Trubetzkoy clearly took a

In conclusion, one can state that there is good evidence that at least some varieties of Modern Irish can be analysed as having a vertical short vowel system, provided one admits a certain abstraction in phonological analysis. The situation is less clear for Scottish Gaelic, where it seems that a larger vowel system must be posited if one is to maintain the traditional description of the consonant system as distinguishing only two consonant colours. Further research in this area is clearly a desideratum, and the recent work of Iosad and Ní Chiosáin (2016) is welcome in this regard.[46]

The preceding subsection discussed approaches to consonant colour and vocalism in Old Irish, while this section has laid out the various approaches to the same issues in Modern Irish, and in contemporary Goidelic varieties more broadly. However, vertical vowel systems of the type which have been described for Modern Irish by numerous authorities, and for Old Irish by the current author, are still not particularly well understood.

While such systems have been described for various languages at different points in time, there has been no comprehensive survey of all the relevant descriptions in the phonological literature. The following chapter aims to remedy this situation by providing such a survey and identifying common features of the phonologies of the languages which have been described as having vertical vowel systems. The results of this survey furnish useful comparanda for the analysis of Old Irish consonant colour and vocalism, which is the main topic of this work.

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dim view of his English contemporaries (Viel 2010), with the exception of Firth, remarking to Jakobson that they approached the study of language "with an almost infantile curiosity, in a sporting fashion". The present work draws more inspiration from the "mentalist" tradition in North American phonology, including Boas (1889), Sapir (1933), and Swadesh (1934), and its Soviet equivalent (Reformatsky 1988), as well as the work of Firth and his followers.

[46] This research would ideally be broadened in scope to test alternative hypotheses about the nature of these issues in Goidelic phonology. In situations such as this, in which it is clear to practically everyone who has discussed this question that distinctions in colour extend across a domain larger than the segment, a strict a priori distinction between consonant and vowel is likely to obscure rather than elucidate matters. This is why much can be learned from the Firthian approach. Furthermore, although it is broadly accepted that there are two distinct consonant colours in modern Goidelic varieties, an attempt should be made to model the data also with three distinct consonant colours, particularly for Scottish Gaelic and northern varieties of Irish, in which a three-way contrast in colour for sonorants has already been described. As regards the vowel systems, the practical non-occurrence of the low vowel between slender consonants in many varieties of Irish (restricted largely to loanwords and occasional more recent formations with the diminutive suffix *-ín*), and the fact that there is at most minimal contrast between mid and high vowels flanked by a broad consonant, suggest that it is also worth trying to model also a two-member vertical vowel system, with /e/ (graphic <ei>) the exponent of the low vowel between slender consonants. It should be noted that a vertical vowel system of two members is the most frequent type found in the comprehensive survey in the next chapter.

Chapter 2: Minimal vowel systems in typological perspective

2.1. Minimal vowel systems

This chapter presents the results of a survey of minimal and vertical vowel systems and discusses the implications of such systems for phonological models. The existence of minimal vowel systems pose a number of important theoretical and analytical difficulties. In assembling available empirical data and categorising examples, both structural and analytical, the chapter makes a contribution to the typological literature on phonological patterning.

This chapter is structured as follows. Section 2.1, below, introduces minimal vowel systems and defines terminology, while section 2.2 presents the results of a typological survey of all the minimal vowel systems that I have been able to find in the phonological literature. Given the fact that this is the first time such a survey has been carried out, a maximalist approach was taken to identifying descriptions with a minimal vowel analysis, facilitating potential future research in this area.

In addition, given the theoretical and representational questions with respect to the vowel system of Irish, outlined in section 1.3, above, special attention was paid to cases in which either larger phonological domains or surrounding consonants condition allophony in the members of minimal vowel systems. Having presented the results of the survey, section 2.3 discusses the theoretical and analytical issues engendered by the languages described therein, and identifies certain comparanda of relevance to the Irish case. The discussion of the survey of minimal vowel systems yields a number of important representational principles which are applied to the description of Old Irish consonant colour and vocalism in chapter 3.

With respect to this section, subsection 2.1.1 discusses the terminology used in to describe vowel systems in this chapter, while subsection 2.1.2 briefly gives an overview of discussions of minimal vowel systems in the phonological literature, and subsection 2.1.3 examines the cross-linguistic distribution of such systems.

2.1.1. Terminological considerations

A *vertical vowel system* is considered here to be one in which only properties of saturation, or height, play a role in differentiating the terms of the system. Vertical vowel systems were first described by Trubetzkoy (1925) for Northwest Caucasian languages, but since then, languages from a number of other families have been described as having such systems. Often, the vowels in these systems exhibit extensive allophonic variation conditioned by surrounding consonants; such is the case in both the Northwest Caucasian languages and Modern Irish. In a number of instances, scholars have presented analyses of languages with only one phonemic vowel, or none at all. While in such descriptions the word *system* is disputable, the term *minimal vowel system* is nevertheless used in this work also for descriptions of languages with no vowels, or only one, as well as for the relatively more familiar systems of the vertical type.

In this section, a typological survey of minimal vowel systems which have been described in the linguistic literature is carried out. For the purposes of the survey, *vowels* are defined, with qualifications, as maximum sonority segments functioning as a natural class.[47] Minimal vowel systems are those which exhibit the fewest phonologically relevant contrasts, while vertical vowel systems are those in which only perceptual properties indexed to height or saturation, i.e. acoustic distinctions in |F1| primarily, are sufficient to distinguish the natural class of vowels.

The typology of vowel systems was the subject of a famous paper by Trubetzkoy (1925), who sought for patterns in the thirty-four vowel systems he knew by heart. Trubetzkoy returned to this issue in his *Grundzüge der Phonologie*,

[47] The term *maximum sonority segments* must be supplemented here with a qualification such as "characterised by the absence of any obstruction" (Trubetzkoy 1939: 94). Otherwise, in languages which are *vowelless*, such as Kabardian in the analysis of Kuipers (1960), glides and perhaps also sonorants would have to be considered *vowels* under this definition.

distinguishing between properties based on degree of sonority or saturation and properties of localisation or timbre (Trubetzkoy 1939: 96). The former, which coincides largely with the articulatory term *vowel height*, can be represented in terms of percepts indexed primarily to |F1| distinctions,[48] with |duration|, and perhaps also |f0|, likely to often be relevant secondary cues. The latter properties, expressed generally with the terms *front* and *back* in articulatory terminology, can be linked acoustically with |F2| distinctions. Trubetzkoy's terms "properties of saturation" and "properties of timbre" are used for the remainder of this section.

On the basis of these two properties, Trubetzkoy distinguishes linear systems, quadrangular systems and triangular systems. In all of these systems, properties of saturation are distinctive, but the three types of system differ in terms of the relevance of properties of timbre. In quadrangular systems, all vowels also display distinctive properties of timbre, while in triangular systems this is true of all vowels except the maximally open phoneme. In linear systems, which are termed *vertical* here, distinctive properties of timbre are not relevant at all.[49]

2.1.2. Minimal vowel systems in the phonological literature

The only linear systems that Trubetzkoy discusses are from Northwest Caucasian languages, where consonant distinctions play a prominent rule in conditioning allophony in vowels. The debate over the vocalism of these languages is covered in greater detail in section 2.2.1, below, but it is interesting to note that for a long period these were considered the only examples in the world of vertical vowel systems. Indeed, when Kuipers presented his *vowelless* analysis of Kabardian, he suggested that it cast doubt on the very existence of vertical vowel systems (Kuipers 1960: 106). Even by the 1970s, comparanda were not well known: Catford (1977: 293) is aware of some

[48] Throughout this thesis, I use pipes, e.g. |F2|, to identify acoustic cues, curly brackets, e.g. {H}, to identify phonological percepts, square brackets to identify articulatory features and phonetic realisations, and slanted brackets to show phonemic (reading) transcriptions.

[49] I am not aware of any *horizontal* vowel systems, e.g. /e ə o/, although three-vowel triangular systems of the form /i a u/ could be modelled on a single axis, with |spectral convergence|, or even just |F2|, as the relevant acoustic cue. This issue is discussed further in section 3.2.

languages of Papua New Guinea discussed in 2.2.4, while S. R. Anderson suggests a parallel in the Upper Yuman languages, dealt with in 2.2.5.

In his typological overview of vowel systems, Crothers (1978) argues that the Northwest Caucasian language Kabardian has five vowels and that the "peculiarity" of its system "lies in the high frequency of the reduced vowels, and not in the structure of the basic vowel quality system" (ibid: 109). This reinterpretation of the Kabardian facts is considered enough evidence to allow him to state a universal: "all languages have /i a u/" (ibid: 115). Counter-examples abound below.

More recent typological overviews of vowel systems often do not mention vertical vowel systems at all. This is true of Lass (1984: 85ff.), but also of Maddieson's oft-cited survey of phoneme inventories based on the UPSID database. The latter does not discuss any vowel system with less than three members (Maddieson 1984: 126), nor indeed any vertical vowel systems. Given their dependence on the same corpus, it is unsurprising that vertical systems are not mentioned in the taxonomy put forward by J-L. Schwartz et al. (1997: 235) either.[50] In Ladefoged and Maddieson (1996: 286) it is recognised that vertical two-vowel systems have been described not just for the Northwest Caucasian languages, but also Arandic languages and Chadic languages, discussed in 2.2.3 and 2.2.7 respectively.

In attempts to model vowel system emergence on the basis of principles of dispersion within the acoustic space, vertical vowel systems are only sometimes discussed. Languages with vertical vowel systems are presented by Liljencrants and Lindblom (1972: 845ff.) as being of a type where |F1| plays a primary role in vowel differentiation, as discussed above. They also suggest that such systems tend to occur in languages with rich consonant distinctions, such as the Northwest Caucasian cases already mentioned. However, in some more recent studies in dispersion frameworks, such as that of Carré (2002) and J-L. Schwartz et al. (1997), vertical vowel systems do not merit a mention.

One computational modelling of vowel systems that does recognise vertical systems is that carried out by de Boer (1999). In fact, one fifth of the three-vowel systems predicted by his model have the form [i e a]. While he seems unaware of the existence of systems of this type, they have in fact been described for Wichita,

[50] Specific problems with reliance on the UPSID database for cross-linguistic enquiry into phonological patterning are dealt with in 2.3, below.

discussed briefly in 2.2.5.1, and Alyawarr, mentioned in 2.2.3.1. Instead, de Boer (1999: 49) relates this type of system to vertical ones, such as Kabardian, although his use of phonetic transcription [ɨ ə a] rather than phonemic /ɨ ə a/ is a little unfortunate, given the extent of allophony which most researchers ascribe to Kabardian.

In all, it is clear that minimal and vertical vowel systems, such as those under consideration here, are only occasionally referred to in discussions on the phonological patterning of vowels or the emergence of vowel systems. Further, there has been no comprehensive survey of minimal vowel systems of which I am aware. While the languages discussed below are unlikely to constitute an exhaustive list of the those with minimal vowel systems which occur in the world's languages, it is hoped that this survey both fills a lacuna in the literature on phonological typology and contributes to debates about vowel system modelling.

The criteria for inclusion in the survey are relatively straightforward. Any language in which differences in |F2| targets do not appear to be relevant for distinguishing between vowels is included. In articulatory terms, these are languages in which a [front-back] contrast is not present in the vowel system. Furthermore, it is only the *basic* vowel system, broadly understood, which is under consideration: subsystems of long vowels, nasalised vowels etc. are not included. The languages surveyed are discussed broadly in the order in which they were first described as having a minimal vowel system. In cases where a number of languages which are closely related or in areal proximity have been analysed as having such a system, they are considered together.

2.1.3. Cross-linguistic distribution of minimal vowel systems

The first modern description of a language having a minimal vowel system that qualifies under the criteria laid out above was Kabardian (Jakovlev 1923; Trubetzkoy 1925). It and other Northwest Caucasian languages have played an important part in discussions of phonological typology, as for a long period their vowel systems were considered to be unique. Some researchers have even claimed that some of these languages do not have a distinct class of vowels (e.g. Kuipers 1960) or have only one

vowel (Allen 1956; S. R. Anderson 1978) The Northwest Caucasian languages are discussed in 2.2.1.

Chinese can also be considered to have a minimal vowel system, and indeed such an analysis has deep roots in the Chinese grammatical tradition (see Pulleyblank 1970-1: 230). A vertical vowel system for Chinese was put forward by the American structuralists, beginning with Hartman (1944), and many, though not all, subsequent researchers have also discussed the Chinese vowel system in minimal or vertical terms. Pulleyblank (1983) goes so far as to put forward a vowelless analysis of Mandarin, building explicitly on minimal descriptions of Northwest Caucasian vocalism in order to buttress his analysis. The case of Chinese is covered in 2.2.2.

Languages of Australia, dealt with in 2.2.3, are somewhat unusual cross-linguistically with regard to their vocalism. Australian languages belonging to two distinct groupings have been described as having minimal vowel systems. Such systems are widely recognised for the Arandic languages of central Australia, which are discussed in 2.2.3.1 the first such analysis being by Kenneth Hale as early as 1959. More recently, the Arnhem language Anindilyakwa has also been analysed as having a minimal vowel system (Leeding 1989: 6), although this has been disputed by other scholars. Anindilyakwa is the subject of subsection 2.2.3.2.

A number of languages of Papua New Guinea, discussed in 2.2.4, have been analysed as having minimal vowel systems. While these languages may not all be related, they are in areal proximity, and have been considered to constitute an areal type, designated Sepik-Ramu (Wurm 1982: 210). The first minimal vowel description of a Sepik-Ramu language of which I am aware is Laycock (1960; cited in Laycock 1991) for the Ndu language Iatmul, although recent research challenges the vertical analysis of this language (Jendraschek 2008; 2012). The Ndu languages are discussed in 2.2.4.1. Two further languages in the same area, the Nor-Pondo language Yimas (Foley 1991), examined briefly in 2.2.4.2, and the Piawi language Haruai (Comrie 1991), covered in 2.2.4.3, have also been analysed as having minimal vowel systems.

A number of unrelated languages of North America, discussed in 2.2.5, have been described as having minimal vowel systems. These analyses are not widely accepted, but they are briefly examined here nonetheless. The languages in question are Caddoan language Wichita, discussed in 2.2.5.1, the Upland Yuman languages, covered in 2.2.5.2, and the Salishan language Nuxálk, examined in 2.2.5.3.

The vertical vowel analysis of Marshallese dates to Bender (1968) and his analysis has been both broadly accepted by subsequent researchers and confirmed by phonetic analysis (Choi 1992). Marshallese is a particularly interesting point of comparison for Irish, as there are numerous similarities in the functioning of the two systems. The vocalism of Marshallese is explored further in 2.2.6.

The first minimal vowel analyses of Chadic languages date to Mirt (1969) and Mohrlang (1971). Nowadays, many languages of this family, especially from the Central or Biu-Mandara branch of Chadic, are considered to have minimal or vertical vowel systems. The modern tradition of description of these languages has its own particularities which are especially interesting from the point of view of phonological representation. The Chadic languages are discussed in 2.2.7.

Descriptions of Turkish within the Firthian tradition (e.g. Waterson 1956) argue for a minimal vowel system in that language. These descriptions have many formal similarities to those of the Chadic languages discussed in 2.2.7 and raise important questions about the commensurability of phonological analyses. The discussion of Turkish is therefore postponed to the general discussion of typological survey in subsection 2.3.

Minimal vowel systems have also been described for Goidelic languages. The first vertical vowel analyses of Modern Irish, applicable to the short vowel system only, are Skerrett (1967) and Ó Siadhail and Wigger (1975). Recently, the vertical short vowel analysis of Modern Irish has been extended to Scottish Gaelic (McConville 2013) and to Old Irish (C. Anderson 2014a; 2014b). Irish is the main focus of this thesis, and the vowel systems of Old Irish and Modern Irish have already been discussed in 1.3. The vertical vowel analysis of Old Irish is central to this work, and is laid out in considerable detail in 3.2.

Before beginning with the survey, a comment is necessary on the transcriptions used here. Given the large number of languages discussed below, and their areal and phylogenetic diversity, it is unsurprising to find a plethora of different transcriptional conventions in use. For the sake of coherence, I have standardised the transcription in what follows, using the IPA symbols for centralised vowels for the members of a vertical vowel system. When a language is considered to have only one vowel, that vowel is always /a/, except possibly in the case of Haruai, examined in 2.2.4, where it is transcribed here as /ə/ and pronounced [ɐ] in isolation. When a language is described as

having two vowels, they are transcribed /a ə/, and when a vertical vowel system has three members the transcription /a ə ɨ/ is used. Only one language in the survey below, Marshallese, has been described as having a vertical vowel system of four members, and its vowel system is transcribed /a ə ɨ ɨ/.

2.2. A typological survey of minimal vowel systems

This section presents the results of a survey of minimal vowel systems. The Northwest Caucasian languages were the first languages to be described as having minimal vowel systems, and these have been widely discussed in the phonological literature. They are discussed in 2.2.1. Despite deep roots in the Chinese grammatical tradition, Chinese, examined in 2.2.2, rarely appears in discussions around minimal vowel systems. Minimal vowel systems have also been described for number of languages of Australia, covered in 2.2.3, and for the Sepik Ramu lanaguages of New Guinea, explored in 2.2.4. A number of lanuages of North America have also been described as having minimal vowel systems. Although a minimal vowel analysis of these languages is dismissed below, the relevant cases are discussed in 2.2.5. Subsection 2.2.6 is focused on the minimal vowel system of Marshallese, which is a particularly useful point of comparison for Irish, while 2.2.7 is concerned with the minimal vowel systems of Central Chadic languages.

2.2.1. Northwest Caucasian languages

The Northwest Caucasian languages are renowned for being typologically unusual from the phonological point of view, with very large consonant systems and very small vowel systems. The forty-seven consonant phonemes of Kabardian according to Choi (1991: 4) are given in the table below. Other sources (e.g. Gordon and Applebaum 2006: 3), give slightly different inventories, reflective of dialect differences. Further Northwest Caucasian languages have even larger inventories than that of Kabardian. G. Hewitt (1979) lists fifty-nine consonant phonemes for Abkhaz, and in his overview of the topic, the same author cites over eighty for Ubykh (G. Hewitt 2004: 97).

In the table below, the numbers represent the localisation of consonants: 1) labial; 2) dento-alveolar; 3) alveolo-postalveolar; 4) postalveolar; 5) plain velar; 6) rounded velar; 7) uvular; 8) rounded uvular; 9) pharyngeal; 10) laryngeal; and 11) rounded laryngeal.

Table 2. The consonant inventory of Kabardian (after Choi 1991: 4)

	1	2	3	4	5	6	7	8	9	10	11
stop	p b pʼ	t d tʼ			k g kʼ	kʷ gʷ kʷʼ	q qʼ	qʷ qʷʼ		ʔ	ʔʷ
affricate		ts dz tsʼ									
fricative	f v fʼ	s z	ɕ ʑ ɕʼ	ʃ ʒ	x ɣ	xʷ	χ ʁ	χʷ ʁʷ	ħ		
nasal	m	n									
lateral		ɬ ɮʼ l									
trill		ɾ									
glide				j		w					

Although there has been some debate on the details of the consonant inventories of Northwest Caucasian languages, more discussion has centred on their vowel systems, in particular on just how minimal they actually are. Often these analytical discussions have fed into larger questions of what is possible in phonological systems and of the implications of typology for historical reconstruction.

The first description of a minimal vowel system of which I am aware, and indeed one of the earliest analyses of any language using structuralist principles, is Jakovlev (1923) for Kabardian. He posited three phonemic vowels in that language: short /a ə/ and long /aː/, that is a two-way distinction in saturation and a distinction of duration for the low vowel. In his review of Jakovlev, Trubetzkoy (1925: 280) reinterpreted this as a three vowel system, the members of which being distinguished by saturation alone, i.e. /a ə ɨ/.[51] This is the first description of a vertical vowel system of which I am aware. The same formulation is repeated in Trubetzkoy (1939: 97) and claimed also for Abkhaz and Ubykh. He states that these were the only examples of vertical vowel systems known to him at that time.

In subsequent years, a number of scholars working on the Northwest Caucasian languages recognised that many instances of Jakovlev's /ə/ were in fact largely predictable. According to Allen (1965: 118) this insight was arrived at independently by

[51] The different interpretations of Jakovlev and Trubetzkoy suggest different transcriptions. What Jakovlev describes as /a: a ə/ corresponds to what Trubetzkoy considers /a ə ɨ/. To avoid confusion, the transcriptional conventions in the remainder of this section will follow those of Jakovlev.

both Genko (1955: 20) and himself (Allen 1956) for Abaza and was also claimed by Vogt (1963: 30) for Ubykh.

Kuipers went one step further in his analysis of Kabardian, reinterpreting Jakovlev's /aː/ as the phonetic reflex of /ha/ initially and /ah/ elsewhere (Kuipers 1960: 33ff.). This analysis removed a number of previously inexplicable distributional anomalies and simplified the rules needed to state the position of stress. Moreover, Kuipers argued that /ə/ is epenthetic in Kabardian, once the position of stress is known,[52] and is thus not a phoneme. That left Kabardian with only one vowel, /a/, which he reinterpreted as a "feature of openness" of consonants (Kuipers 1960: 50-1), parallel to features of secondary localisation. Allen (1965: 124) summarises this as follows: "[b]y the suggested analysis we have no distinction of vowels and consonants, but simply 'segments', having open, palatal and labial components which parallel the 'normal' minimal vocalic pattern (a-i-u) with its two dimensions of tonality and resonance".

As Kuipers himself recognised (1960: 104-5), the positing of a language with no phonemic vowels at all, or one at most, was of relevance to contemporary reconstructions of Proto-Indo-European. Following the recognition by Kuryłowicz (1935) that incidences of Hittite /h/ reflected the *coéfficients sonantiques* of Saussure (1879), a number of prominent scholars had proposed a single vowel for the protolanguage.[53]

Opposition to this reconstructed vowel system marshalled typology as an argument, most famously in Jakobson's comment that "l'image d'un proto-indo-européen n'ayant qu'une seule voyelle, ne trouve aucune confirmation dans les langues du monde dont on possède une description" (Jakobson 1957: 75).[54] The case against these one vowel reconstructions was reaffirmed by Szemerényi, who included typological argumentation (1964: 4ff.) which was subsequently disputed by Allen

[52] This aspect of the analysis is challenged by Job (1977: 54-6).

[53] It seems some very prominent European linguists supported the one-vowel theory for PIE, including Beneviste (1935), Hjelmslev (1936-7), Lehmann (1952: 111) Borgstrøm (1954b) and Malmberg (1967: 129). While this view seems to have fallen out of favour in the present day, some Indo-Europeanists still seem sympathetic to it. Kortlandt explicitly references Northwest Caucasian languages and Pulleyblank's (1983) description of Mandarin (see 2.2.2) before stating "in comparison [...] the reconstruction of a single vowel for Proto-Indo-European looks rather conservative" (Kortlandt 1995: 96).

[54] The one-vowel picture of Proto-Indo-European finds no support in the recorded languages of the world.

(1965). Szemerényi returned to the topic in 1967 and was again challenged, this time by Kuipers himself (Kuipers 1968).[55]

The issue of Northwest Caucasian vocalism, and that of Kabardian in particular, was also an issue in theoretical rather than historical linguistics. Generally, the analysis of Kuipers of [aː] as a cluster has been accepted by subsequent scholars,[56] particularly because of the parallelism with other long vowels. In Kabardian, the clusters /əj aj aw əw/ are, after all, typically realised as long vowels, e.g. /baj/ 'rich' [beː] (Kuipers 1960: 23).

As regards the short vowels, an acoustic study by Choi (1991) shows considerable allophony conditioned by the preceding consonant.[57] He takes the vowels after labials, dento-alveolars and the plain laryngeal, i.e. (1), (2) and (10) in Table 3.1 above, to be 'neutral' and describes allophony in other vowels with reference to these. A preceding postalveolar, i.e. (3) and (4) in the table above, causes a decrease in |F1| and an increase in |F2| in the following vowel, meaning that this vowel is 'fronted' in articulatory terms.[58] After the plain velars, (5), there is a decrease in |F2|, meaning that 'backed' allophones are found, except in the case of /aː/, which Choi considers an independent phoneme.[59] Rounded velars, (6), induce further backing in a following vowel. What holds true for (5) and (6) is equally true for the uvulars, (7) and (8), although in this case with a concomitant increase in |F1|, meaning these allophones are lowered with respect to the neutral values. The pharyngeal /ħ/, (9), also causes an increase in |F1| and a decrease in |F2|. This data is summarised in the table below, adapted from Choi (1999).[60] Superscript [ˤ] and [ʁ] denote pharyngealised and uvularised vowels respectively.

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[55] In Comrie (1981: 207), George Hewitt points out that the Proto-Kartvelian reconstruction of Gamkrelidze and Mačavariani (1965) also envisages a single vowel language, which should be taken into account in the typological discussions concerning Northwest Caucasian and Proto-Indo-European.

[56] Kumakhov (1973) constitutes an exception.

[57] Unfortunately, Choi's study does not include any analysis of the effect of a following rather than preceding consonant. As Wood (1990: 207-8) points out, it is likely that vowel quality is influenced also by the consonant which follows. Indeed, this is the case for a number of other languages with vertical vowel systems, such as Marshallese, explored further in 2.2.6, the Chadic language Gude, discussed in 2.2.7, and both Modern Irish, dealt with in 1.3.2, and Old Irish, discussed in detail in 3.1.3, below.

[58] In a subsequent study, Wood (1994: 247ff.) failed to find fronted vowels in this environment, except when adjacent to /j/.

[59] Choi (1991) follows Trubetzkoy's rather than Jakovlev's assumptions about the Kabardian vowel system, without, however, disputing the content of Kuipers' reanalysis of the long low vowel.

[60] The analysis of Choi (1991) is accepted as fact by Ladefoged and Maddieson (1996: 286-7) without consideration of the issues, claiming that there are "three phonemically contrastive vowels (not as far as

Table 3. The vowels of Kabardian (after Choi 1991: 9)

C-	3, 4	1, 2, 10	9	11	5	7	6	8
e.g.	ɕ, ʃ	p, t, ʔ	ħ	ʔ°	k	q	k°	q°
/ə/	i	ɨ	ɨ^{ʕ}	ʉ	ɯ	ɯ^{ʁ}	u	u^{ʁ}
/a/	e	ə	ə^{ʕ}	ɵ	ɤ	ɤ^{ʁ}	o	o^{ʁ}
/a:/	æ	ɐ	ɐ^{ʕ}	ɞ	ɑ	ɑ^{ʁ}	ɒ	ɒ^{ʁ}

As regards the duration of the low /aː/, Choi (1991: 8) reports that it is indeed significantly longer than either of the other two vowels, as long in fact as the long vowels [iː eː oː uː], which result from clusters of /a/ and /ə/ with the glides /j w/. This leads him to suggest that a length contrast rather than only one of height could be present in Kabardian, effectively returning to the analysis of Jakovlev (1923).

Disagreements over the best analysis of the Kabardian vowel system continued into the 1970s, particularly regarding the question of the epenthetic nature of /ə/. Although Halle (1970) accepts Kuipers' analysis of /aː/, he rejects his analysis of /ə/,[61] leading to further defence by the original author in Kuipers (1976). Subsequent theoretically-orientated linguists were somewhat more sympathetic to the system of Kuipers (1960). S. R. Anderson (1978) largely endorses it, although remaining sceptical over the treatment of /a/ as a feature of openness,[62] and his article was reviewed positively by McCarthy (1982: 200). The system of Kuipers is accepted wholeheartedly by J. Anderson (1991), who attempts to enact the vowelless analysis within the theoretical framework of Dependency Phonology.

The debate over the vocalism of Northwest Caucasian languages has not diminished in recent years either. While Gordon and Applebaum (2006) reject the epenthetic analysis of /ə/ in Kabardian, Gordon and Applebaum (2010: 6) are considerably more circumspect, appealing instead to well-formedness constraints and different types of word minimality in their description of the language. Peterson (2003) proposes that the essential difference between /a/ and /ə/ is that the former is mora-bearing while the latter is not.

Minimal vowel systems in other languages rarely find their way into the debates on vocalism in Northwest Caucasian languages and it is possible that cross-linguistic

Kabardian is concerned, two, one or zero as suggested by Kuipers 1960, S. R. Anderson 1978 and Halle 1970 respectively (sic.))".

[61] The subsequent two-vowel analysis of Kabardian having /a ə/, is perhaps the most common position, e.g. Colarusso (1992: 25).

[62] Peterson (2003) reprises this idea in terms of moraic theory.

insights, such as those put forward in this survey, might be of benefit. In the following sections, other languages which have been described as having minimal and vertical vowel systems are discussed, beginning with the case of Chinese, a language for which the various analyses of the Northwest Caucasian languages have had some influence.

2.2.2. Chinese languages

The basic structure of the Mandarin Chinese syllable was traditionally analysed as consisting of an initial (声母, pinyin *shēngmǔ*) and a final (韵母, pinyin *yùnmǔ*) (Baxter 1992: 6; Kurpaska 2010: 15) symbolised here with the cover symbols α and ω respectively. From a segmental perspective, this syllable is often parsed differently, considered to have a canonical form (C)(G)V(X) (e.g. Duanmu 2007: 15), where the consonantal onset C and the glide G together replace the initial, while the vowel nucleus V and the final X (which in Mandarin may be a glide, a nasal or a rhotic) correspond to the final.

Given the largely analytical structure of Chinese, there is a paucity of morphonological evidence which might give clues as to phonological structure. However, while a wide variety of phonetic vowel sounds occur in Mandarin, most researchers agree that there is extensive allophony, and that far fewer of these vowels actually contrast at a certain level of abstraction. The vast majority of descriptive works on Mandarin of which I am aware agree that there is one phonemic low vowel and one phonemic mid vowel in the language. Occasional exceptions, such as Lin (2001: 26), posit two mid vowels instead.

As regards the high vowels there is considerably more dispute. Hockett (1955: 88) lists four high vowels for Mandarin, /i y ɨ u/,[63] and Cheng too (1973: 14) argues explicitly for four underlying high vowels in the language. More recent descriptive grammars, such as Lin (2001: 26) and Duanmu (2007: 35), instead put forward three. However, Hartman (1944) argued in favour of only one phonemic high vowel in the

[63] Elsewhere, the same author does recognise that Mandarin high vowels and semi-vowels are in some manner of complementary distribution (Hockett 1955: 62). In his own terminology, /i/ and /u/ are not strictly speaking vowels, given the fact that they can occur both as syllable peak and syllable margin (Hockett 1955: 75).

dialect of Beijing,[64] considering the other phonetic high vowels to be sequences: [i] would thus be the phonetic realisation of the phonemic sequence /jɨ/ and [u] the realisation of /wɨ/. In other words, a preceding segmental glide is considered to condition the realisation of the single high vowel phoneme. For Hartman, problematic nuclei in [y] and the glide-nucleus sequences in [ɥV] were consided to be phonetic realisations of the phonemic sequence /jwV/.

This analysis amounts to a vertical vowel system and was well received by the structuralists, being explicitly endorsed by Chao (1968). Martin (1957) notes that certain cases of assimilation might give rise to very marginal minimal pairs but his treatment of the vowel system also paved the way to an abolition of the high vowel phoneme altogether. In Hashimoto (1970: 216) the high vowels [i] and [u] are considered to reflect /Cjəj/ and /Cwəw/ respectively, and [ɨ] is considered the default vowel, the realisation of an underlying consonant specified only for tone, without a following vowel. This implies a two-member vertical vowel system and the existence of vowelless words.[65]

Chinese languages were important in the development of the phonology of the London school of prosodic analysis. Firth and Rogers (1937) was a very influential early paper in the development of this phonological framework and Chinese was also a key focus of research for M. A. K. Halliday, comprising a full volume in his collected works (Halliday 2005). Halliday (1992) considers that both the initial (α) and the final (ω) of the Chinese syllable can be possessed of one of three prosodies, A-prosody,[66] W-prosody or Y-prosody. He considers a final coronal nasal to be characterised by Y-prosody and a final velar nasal to have W-prosody.

Although Halliday (1992) assumes a three-way distinction in height in Chinese finals, corresponding to a vertical vowel system /a ə ɨ/, some researchers have reduced this to a two-vowel system, /a ə/, taking the high vowels to be sequences. Indeed, in Halliday's system, there are far less syllables based on /ɨ/ than on /a/ or /ə/, suggesting that the former might be amenable to an alternative analysis. In the table below, the two -vowel analysis of (i.a. Hashimoto 1970) is assumed, although the transcriptions follow

[64] "Peiping" in Hartman's paper, elsewhere also "Peking".
[65] See also Hockett (1947: 265f.) and Joos (1963: 123).
[66] The term does not imply pharyngealisation necessarily, as this is not generally posited for Modern Chinese, although it has been reconstructed for earlier periods of the language (cf. Norman 1994; Pulleyblank 1996, 1998).

Halliday (1992: 102) for the most part, using the affricates /ʈʂ/ and /ʨ/ (Pinyin <zh> and <j>) as examples for the initials.[67]

In the table, superscript a, y, and w have been used for the three prosodies, while the initial is represented with α and the final with ω. Forms with /a/ and a final glide, represented /∅/ are shown first, then forms with /a/ and a final nasal, then forms with /ə/, then forms with /ə/ and a final nasal. Pinyin transcription is given in each case.

Table 4. The monosyllables of Chinese (after Hashimoto 1970; Halliday 1992: 102)

	/a∅/	Pin.	/aN/	Pin.	/ə∅/	Pin.	/əN/	Pin.
$\alpha^a\_\omega^a$	ʈʂa	*zha*			ʈʂɤ	*zhe*		
$\alpha^a\_\omega^y$	ʈʂæɛ~æe	*zhai*	ʈʂæn~ǣ~æɛ̃	*zhan*	ʈʂeɪ~əɪ	*zhei*	ʈʂə̃n~ə̃	*zhen*
$\alpha^a\_\omega^w$	ʈʂɒɔ~ɒo	*zhao*	ʈʂɒŋ~ɒ̃~ɒ̃	*zhang*	ʈʂəʊ~oʊ	*zhou*	ʈʂəŋ~ə̃	*zheng*
	/a∅/	Pin.	/aN/	Pin.	/ə∅/	Pin.	/əN/	Pin.
$\alpha^y\_\ \omega^a$	ʨ^{i}a	*jia*			ʨe~^{i}e	*jie*		
$\alpha^y\_\omega^y$			ʨ^{i}ɛn~ɛ̃n~ɛ̃	*jian*	ʨi	*ji*	ʨĩn~ĩ	*jin*
$\alpha^y\_\omega^w$	ʨ^{i}ɑɔ~ɒɔ~ɑo	*jiao*	ʨ^{i}ɑŋ~ɑ̃~ɒ̃	*jiang*	ʨ^{i}ɔʊ~^{iə}ʊ	*jiu*	ʨĩ^{ə}ŋ~ĩ^{ə}	*jing*
	/a∅/	Pin.	/aN/	Pin.	/ə∅/	Pin.	/əN/	Pin.
$\alpha^w\_\omega^a$	ʈʂ^{u}a	*zhua*			ʈʂo~^{u}o	*zhuo*		
$\alpha^w\_\omega^y$	ʈʂ^{u}œɛ~æɛ~æe	*zhuai*	ʈʂ^{u}œn~œ̃~æ̃	*zhuan*	ʈʂ^{uə}ɪ~^{u}ɛɪ	*zhui*	ʈʂʊ^{ə}n~ʊ^{ə}~ʊ^{i}n	*zhun*
$\alpha^w\_\omega^w$			ʈʂ^{u}ɔŋ~ɔ̃	*zhuang*	ʈʂu	*zhu*	ʈʂuŋ~ũ	*zhong*
	/a∅/	Pin.	/aN/	Pin.	/ə∅/	Pin.	/əN/	Pin.
$\alpha^{yw}\_\omega^a$					ʨ^{y}e~ʨ^{y}ø	*jue*		
$\alpha^{yw}\_\omega^y$			ʨ^{y}æn~æ̃~æɛ̃	*juan*	ʨy	*ju*	ʨyn~ỹ~y^{i}n	*jun*
$\alpha^{yw}\_\omega^w$							ʨ^{y}ʊŋ~ʊ̃~^{i}ʊŋ	*jiong*

The only form not accounted for in the table above is *zhi* [ʈʂɨ]. In Hashimoto (1970), this is considered to be epenthetic, reflecting underlying /ʈʂ/, specified for tone but without a final. While the table above accounts reasonably for the facts, there are still many gaps, which do not have a principled explanation. It is worth asking if a vowel system /a i u/, with three members might better account for the observed distribution.

The vertical vowel analysis of Chinese put forward by the structuralists was extended to the realm of historical linguistics by Edwin Pulleyblank, who argues for only two phonemic vowels /a/ and /ə/ in his reconstructions (e.g. Pulleyblank 1970-1). This is disputed by Baxter (1992: 256), who admits that a two-vowel system works in

[67] Halliday actually uses /ɖʐ/ and /ʥ/ here, but I have favoured the practice of other specialists on Chinese and transcribed these sounds with the IPA symbols for voiceless unaspirated rather than those for voiced. I have also used [ɨ] in preference to Halliday's [ɿ] and have silently reverted to the IPA in cases where he uses [ɐ] for [œ]. His practice of using [æ] for IPA [a] and [a] for the maximally open vowel has been followed in the exposition below.

terms of reconstruction, but dismisses it on purely typological grounds: "I would argue that a two-vowel system such as Pulleyblank's, while not impossible, is too unusual to be our first choice in reconstructing Old Chinese".

It is clear that Pulleyblank's work on Chinese diachronic and synchronic phonology was influenced by the debates over Northwest Caucasian vocalism. In Pulleyblank (1983: 22) he explicitly endorses the position of Kuipers (1960) regarding Kabardian vowels and refers to other scholars who entered the debate on the vowel system of that language (e.g. Halle 1970). Pulleyblank continues by presenting an analysis of Modern Pekingese without any phonemic vowels whatsoever:

> In the above analysis of Pekingese, schwa is treated as epenthetic and not only the high vowels i, u and y, but also the low vowel a, are treated as syllabic forms of glides with which they alternate morphophonemically. This opens up the possibility of postulating underlying morpheme structures in which there are only consonants and deriving all surface vowels by rules of syllabification. (Pulleyblank 1983: 57)

The possibility of a vowelless analysis of Chinese is occasionally mentioned in subsequent treatments but has neither gained widespread acceptance nor been decisively refuted. Wang (1993) works on the basis of two vowels in a vertical system, while Duanmu (2007: 35-6) simply states that he does not pursue Pulleyblank's analysis without giving any justification for not doing so. In shorter grammatical works such as Lin (2001), the issue is generally not even mentioned and much larger systems of vowel phonemes are put forward without comment.

The arguments in favour of a vertical vowel system for Chinese languages, Mandarin in particular, are, however, well established in the phonological literature. The extensive systems of phonetic vowels in languages such as Mandarin can be analysed as much smaller phonemic systems in which only properties of saturation distinguish terms, with extensive allophony conditioned by surrounding consonants.

The use of Firthian prosodic analysis, when compared to a segmental account with glides, is more in keeping with the native Chinese grammatical tradition (Pulleyblank 1970-1: 230), better reflective of the phonetic reality[68] and yields a better distributional statement. Similar treatments in prosodic terms have been successful in describing the phonology of other languages with minimal or vertical vowel systems,

[68] In this respect, the remarks of Chao are telling. He states that the initial of Chinese monosyllables is generally pronounced as a single sound, rather than a sequence of consonant plus glide (1934: 42-3).

such as the Chadic languages discussed in 2.2.7, below. Further arguments as to the relevancy of Firthian prosodic analysis to the study of minimal vowel systems are also given in 2.3 below.

The following sections look at descriptions of minimal and vertical vowel systems in other languages. Unlike Northwest Caucasian or Chinese, the phonologies of the languages in question have not seen a great deal of research and often only a small number of descriptive works are available. For this reason, the next three sections concentrate on large geographical areas and deal with numerous, sometimes unrelated, languages, focusing on aspects of their analysis which are of specific interest to the topic at hand. Sections 2.2.4 and 2.2.5 deal with minimal and vertical vowel systems in Papua New Guinea and North America respectively, while section 2.2.3, below, explores such vowel systems in the languages of Australia.

2.2.3. Languages of Australia

The phonological systems of the languages of Australia exhibit a number of particularities not often found in the cross-linguistic literature (see Wurm 1972: 48ff.; Dixon 2002: 63-5, 547ff.) both in terms of their synchronic phonologies (see Butcher 2006) and with regard to diachronic developments (see Blevins 2001). The vowels of many of these languages are often comparatively centralised, using less of the vowel space than is common in languages elsewhere in the world, although tending to maintain similar principles of dispersion (Butcher 1994). These peculiarities make the languages of Australia particularly interesting from the point of view of the theoretical discussions around minimal vowel systems, and are discussed in this respect in section 2.3, below.

Minimal vowel systems have been described in two separate language families in Australia: in the Arandic branch of the Pama-Nyungan language family, and in the Anindilyakwa language of the non-Pama-Nyungan Arnhem family. While the phonetically centralised vowels of these languages might suggest a transcription such as /ɐ ə/ rather than /a ə/ for a two-member vertical vowel system,[69] the latter conventions

[69] As used, for example, by Tabain and Breen (2011).

are used here in order to maintain transcriptional consistency throughout this chapter. The Arandic languages are discussed first, in subsection 2.2.3.1, below, after which the case of Anindilyakwa is examined in 2.2.3.2.

2.2.3.1. Arandic languages

Minimal and vertical vowel systems are well attested in the Arandic languages. It was Ken Hale (1959) who first proposed a vertical vowel system, /a ə/, for Kaytetye, with allophonic variation dependent on surrounding consonants, and this view has been defended also subsequently (e.g. H. Koch 1984, 1997; Turpin and Demuth 2012). The same system has been described for Eastern Arrernte (Ladefoged and Maddieson 1996: 286), although many dialects also have a "fairly marginal third vowel /i/" (Breen and Pensalfini 1999: 23).[70]

In Central Arrernte, /a/ and /ə/ only contrast medially, while only short allophones of /a/ occur initially and only long ones of /ə/ finally. In the contrasting medial environment, spectrographic analysis shows that the |F2| of /ə/ is 1) more liable to influence from the conditioning effects of surrounding consonants than /a/, and 2) shorter than /a/ in duration (Tabain and Breen 2011: 81). The relative immunity of /a/ vis-à-vis /ə/ to the colouring effect of surrounding consonants is also attested in Chadic languages (Pearce 2008), explored further in 2.2.7, and in Irish as well.

As regards the durational difference, this is a cross-linguistic tendency for low vowels to be longer than high ones, all other things being equal (Lehiste 1970: 18). For another Arandic language, Antekerrepenh, Breen (1977) posited a durational contrast between /a/ and /aː/, although the same author now prefers to analyse the system of that language as having /ə/ and /a/ (Breen 2001). It is likely that both |duration| and |F1| are relevant cues to the distinction between the two terms. It should be noted that

[70] I presume that the three vowels /a e i/ which Breen (2001: 57) gives for another Arandic language, Alyawarr, reflect a similar system. While at first glance /a ə i/ might be a more natural transcription, if the same tendency exists as in Northwest Caucasian languages, where *neutral* allophones of mid vowels are relatively fronted in the vowel space (cf. Choi 1991: 7), then the transcription /a e i/ is well motivated. While a vowel system /a e i/ is typologically unusual, even by the standards of the systems described in this chapter, it has also been put forward for Wichita (Rood 1975), discussed in 2.2.5, below, and is predicted by the computational modelling of de Boer (1999).

difficulties in interpretation regarding low vowels are also common in the disputes over Northwest Caucasian vocalism, discussed in 2.2.1, above.

The Arandic languages are typologically somewhat unusual in a number of respects and their phonologies are complex on both the synchronic and diachronic planes (see Wurm 1972: 40-1). In particular, they are some of the few languages on earth to have been analysed as having basic VC syllabification (Breen and Pensalfini 1999; Tabain et al. 2004; Butcher 2006: 205f.; G. Schwartz 2013: 13ff.). It is possible that further research will shed more light on the issues discussed here but it is now time to discuss another Australian language with a complex phonology for which a minimal vowel system has been posited, to wit the Arnhem language Anindilyakwa.

2.2.3.2. Anindilyakwa

There is considerable dispute over the vowel system of the Arnhem language Anindilyakwa,[71] but a minimal vowel system is one of the possibilities which have been put forth in the phonological literature. While Stokes (1981: 141ff.) considers it to have the vowel system /i e a u/, she notes that there is only "marginal contrast between /i/ and /u/ and that in many words 'free fluctuation between the phonemes /e/ and /a/ is permissible". There are also tight distributional constraints on vowel occurrence, with word-medial being the only possible environment for contrast and that there is considerable interspeaker variation. Further to the alternation between /a/ and /e/ already noted, alternations between /i/ and /e/ on the one hand, and /i/ and /u/ on the other, also exist.[72]

The most recent work (Egmond 2012: 61-76) also has a four-vowel analysis, although with different primary members, /a ɛ ə i/, and different allophones. For

[71] The language is spoken on the island of Groot Eylandt in the Gulf of Carpentaria. For this reason, it is sometimes known as Groot Eylandt. As is the case for many of the indigeneous languages of Australia, there are a wide range of variant spellings in use, e.g. Enindhilyakwa, Anindhilyagwa, Enindhilyagwa, etc.

[72] Stokes (1981: 178) notes that she originally followed unpublished work on Anindilyakwa by Mary Upton, née Moody, who posited a five vowel system for the language, /a e i ɨ u/. However, at the suggestion of Velma Leeding, she adopted a four-vowel analysis instead, assigning high centralised vowel allophones to either /i/ or /u/ instead. However, the range of alternation admitted in Stokes (1981) suggests that this might not be an ideal solution. Leeding later adopted a two-vowel analysis of Anindilyakwa (Leeding 1989), discussed further below.

Egmond, /a/ has the allophones [a æ aʊ ə ɛ], with the rare /ɛ/ also being underlying, having the allophones [ɛ] and [ə]. As regards the other vowels, /i/ has the allophones [i ə u], while /ə/ has the allophones [ə ʊ u i]. The resulting vowel system, /a ɛ ə i/ is typologically unusual, although it is not a minimal vowel system in the terms defined in this chapter. It should be noted, keeping in mind the frequent correlation of duration and vowel saturation mentioned above, that Egmond claims that /a/ and /ɛ/ are consistently longer than /ə/ and /i/, and attract stress (Egmond 2012: 16, 27f., 45, 48).

Other scholars have put forward analyses of Anindilyakwa under which it can be considered to have a minimal vowel system. According to Egmond (2012: 48), Heath (1975) recognises one "real" phonemic vowel, /a/, and two "parasitic" or distributionally restricted vowels, /æ/ and /ɛ/.[73] Leeding (1989: 38ff.) instead considers Anindilyakwa to have two vowels, low /a/ and high /ə/,[74] with considerable allophony conditioned by position in the word, the vocalism of surrounding syllables, and the primary localisation of adjacent consonants. Four types of rules, namely fronting, rounding, backing and lowering, generate the allophones [a æ aᶦ æᶦ e eᶦ ɒ aᵘ] for low /a/, and [i ɪ u ɯ ə o a] for high /ə/. Interestingly, Leeding (1989: 40) also notes that regressive conditioning takes precedence over progressive conditioning of vowels in Anindilyakwa.

The overall picture from the different analyses of Anindilyakwa is somewhat confused. There appears to be considerable overlap in the vowels of the language and it is not straightforward to determine which vowels are phonemic, hence the plurality of analyses. However, some comments are in order. Firstly, the vowel system /a æ ɛ/ put forward in Heath (1975), which relies on epenthetic /ə/ to account for the high vowels, is without parallel in any vowel system of which I am aware. As well as the fact that this vowel system is highly unusual from the typological point of view, Egmond gives good arguments against the epenthetic status of the high vowels, pointing out that they can receive primary stress and do not consistently show the conditioning one might expect of predictable vowels (Egmond 2012: 67).

[73] Unfortunately, I have been unable to access Heath's unpublished work on Anindilyakwa, so have had to rely on secondary reports in Egmond (2012). The vowel system given, /a æ ɛ/, is highly unusual from a typological point of view.

[74] Transcribed /ɨ/ in the original, but with /ə/ here to maintain transcriptional integrity with the rest of this chapter.

Secondly, the vowel system put forward by Egmond, i.e. /a ɛ ə i/, is also unusual from a cross-linguistic perspective. In particular, her arguments in favour of positing the rare /ɛ/ are somewhat weak, and her criticisms of Leeding rest primarily on the grounds that the latter's analysis is too abstract (Egmond 2012: 65).

Thirdly, all the accounts, although most noticeably those of Egmond (2012) and Stokes (1981), rely to a large degree on significant overlap of allophones: often a given symbol corresponds to both a phoneme in its own right and the allophone of another phoneme, which itself may be an allophone of the first, e.g. /i/ and /ə/ both have the allophones [i ə u] in Egmond (2012).

All things considered, the treatment of Anindilyakwa phonology given in Leeding (1989) perhaps draws a clearer picture than the alternatives, notwithstanding the fact that it also suffers from some of the shortcomings outlined above and rests on a large number of rules to generate the relevant allophones. It is to be hoped that future study of Anindilyakwa phonology might shed more light on the difficulties involved in analysing its vowel system.[75] However, it is now time to move the discussion across the Arafura Sea, in order to investigate reports of minimal vowel systems in a number of languages of New Guinea.

2.2.4. Sepik-Ramu languages

While the exact relationship of the languages under consideration here is uncertain, they share considerable commonalities in their phonologies (Wurm 1982: 209f.), which identify them as belonging to an areal type which is often referred to as the Sepik-Ramu type. In general, these languages have extensive consonant systems, but smaller vowel systems, in which many instances of phonetic vowels can be shown to reflect more abstract representations without vowels. Minimal vowel systems, under the definition in use here, have been described for the Ndu languages, covered in 2.2.4.1, the Nor-Pondo

[75] Looking at the general trends which emerge from the various descriptions of Anindilyakwa, one wonders if a three-vowel system might not resolve some of the problems. Indeed, a close reading of Stokes (1981) suggests as much, with the likelihood that the high vowels are not fully contrastive, as in Leeding (1989). The resulting system, perhaps /a e i/, would then resemble some Arandic languages, dealt with above.

language Yimas, which is the topic of 2.2.4.2, and the Piawi language Haruai, examined in 2.2.4.3.

2.2.4.1. Ndu languages

A number of Ndu languages have been analysed as having minimal or vertical vowel systems. According to Jendraschek (2008: 3), the first claim for a vertical vowel system in the Ndu family goes back to a talk by Don Laycock in 1960. The first published claims of this nature being by Staalsen (1963, 1966) for the Iatmul language. According to Staalsen (1966: 69), Iatmul has a three-member vertical vowel system /a ə ɨ/, with the allophones of /ɨ/ and /ə/ patterning as follows:

Table 5. The vowel system of Iatmul (after Staalsen 1966: 69)

	_ j/ɲ	j/ɲ_	elsewhere	w_	_w
ɨ	i	ɪ	ɨ	ʊ	u
ə	e	ɛ	ə	ɔ	o

The high vowel /ɨ/ surfaces as [i] before /j/ or /ɲ/ and as [ɪ] after either /j/ or /ɲ/. In parallel fashion, before /w/ it surfaces as [u] and after /w/ as [ʊ]. In all other environments, the neutral allophone [ɨ] appears.[76] The patterning of the allophones of /ə/ is similar to that of /ɨ/, but no significant allophony is reported for /a/ (Staalsen 1966: 70). A practically identical statement for Iatmul can be found in Foley (1986: 49) and Laycock (1991: 108) describes a very similar system for another Ndu language, Abelam, with palatalised and labialised consonants conditioning allophony alongside /j/ and /w/ respectively.[77]

[76] Staalsen (1966: 70ff.) also reports that when any of the three vowels does not have a preceding consonant, then a preceding glottal stop appears instead. I find this difficult to square with his later comment that only /a/ occurs when there is no preceding syllable margin, citing the word /a.wa/ [ʔawa] 'yes', but, if I follow the logic, precluding **/ə.wa/ or **/ɨ.wa/. The question of glottalisation in Iatmul vocalism is dealt with in more detail by Jendraschek (2008: 6ff.; 2012: 40ff.).

[77] Pike (1964: 130f.) briefly reports on a number of similar cases in the Sepik river basin. Foley (1986: 49-50) mentions a study of Yessan-Mayo, a non-Ndu language spoken upriver from Iatmul, with a very similar system of allophony, but also including the back vowel /ɔ/. However, the only phonological analysis of that language which I have seen (Foreman and Marten 1978) does not have a phoneme /ɔ/ and gives a seven vowel system. However, the authors consider a number of these to be "portmanteau" realisations of vowel-glide sequences, suggesting that a similar principle might be at work in that language. Unfortunately, Foreman (1974) does not discuss phonology.

Interestingly, /a/ is reported to be considerably longer than the other vowels in Ndu languages and this greater length has led a number of researchers to posit vowel systems of the form /a: a ə/ (e.g. Laycock 1991: 108). This is highly reminiscent of the analytical debate concerning Kabardian, discussed in detail in 2.2.1. In this instance, the analysis of Laycock (1991) parallels that of Jakovlev (1923), while that of Staalsen (1966) can be compared to that of Trubetzkoy (1925).

Furthermore, Foley (1986) points to Pawley's analysis of Kalam (Pawley 1966)[78] to suggest that the high vowel in Ndu languages might be epenthetic, at least before /j w/ (cf. also Jendraschek 2012: 33). This would leave these languages with a vowel system /a ə/, or possibly /a: a/. Similar debates over the underlying or epenthetic nature of the high vowel in a minimal system have already been outlined with reference to Kabardian in 2.2.1, and are also widespread in discussions over vocalism in Chadic languages, examined further in 2.2.7.

However, recent work on Iatmul in particular has tended to undermine rather than reinforce the minimal vowel analysis of that language. Jendraschek describes twelve phonemes in seven positions in Iatmul (Jendraschek 2008: 12, 2012: 47), one of which he reports as being "emergent". He claims that the realisations [ɪ] and [ʊ] following /j/ and /w/ respectively are not accepted by his informants. Furthermore, he says that not all instances of a high vowel before /ŋ/ surface as [i], e.g. *munya* [mʉŋa] 'breast', and *ki'nya* [kɨŋa] 'tomorrow' and that, accordingly, not all high vowels can be seen as allophones of /ɨ/.[79]

Instead, he finds it necessary to posit phonemic /i/ and /u/ as well as /ɨ/ and similar arguments are used to establish the phonemicity of /e/ and /o/. Jendraschek's account also describes two short plain low vowel phonemes (Jendraschek 2012: 37ff.), two distinctive glottalised low vowels and a length distinction for /a/ and /u/, bringing the total number of low vowel phonemes to five. It should be noted that the resulting vowel system is unusual and there are serious distributional anomalies recognised by

[78] See also the typological discussion over Kalam predictable vowels in Blevins and Pawley (2010) and both Foley's (1991) analysis of Yimas and Comrie's (1991) of Haruai, discussed below.

[79] In Jendraschek's dictionary of Iatmul (Jendraschek 2007, 2012: 539-51) I could not find *any* instances of /i/ before /ŋ/. He states that the [ʉ] in *munya* is an allophone of /u/ that occurs regularly after /m/ and sporadically after /mb/ (Jendraschek 2012: 39), but the reader is still left wondering if the three high vowel phonemes are really distinctive.

the author himself (Jendraschek 2012: 69f.).[80] Notwithstanding this, these research results, carried out as part of a comprehensive study of the language, cast serious doubt on the minimal analysis of Iatmul, although the same cannot ipso facto be said for other Ndu languages.[81]

2.2.4.2. Yimas

Another language of the Sepik basin, the Nor-Pondo language Yimas, has been analysed as having a minimal vowel system. Foley (1991: 44-9) notes that in Yimas the vowels [a i ɨ u] occur phonetically, but while [aj] and [aw] are attested, often realised as [ej] and [ow] respectively, the surface forms [ɨj] and [ɨw] are not. This leads to the possibility, supported by morphological evidence, or interpreting [i] and [u] as the phonemic sequences /əj/ and /əw/.[82] This leaves Yimas as a two vowel language, having only /a/ and /ə/ in its phonemic inventory. As in many other languages discussed in this chapter, /ə/ is very frequently epenthetic. Foley does not note any other vowel allophony.

2.2.4.3. Haruai

Haruai is a language of the Piawi family, for which Comrie (1991) suggests a minimal vowel system, with only one member, /ə/. While at first glance Haruai appears to have

[80] Perusal of the dictionary (Jendraschek 2012) reveals further anomalies not discussed by the author. The phoneme /uː/ occurs only three times in root words, while the distribution of /i/ seems to be quite restricted, many instances being either in open monosyllables or followed by /j/. The mid vowels also show a number of distributional anomalies: /e/ does not occur in the initial syllable after /v l/ or a nasal, while /o/ seems quite rare, many instances being before a labial or labialised consonant. The initial consonant sequences raise further suspicions, with /w/ only occurring after /k/, /ŋg/ and /ɲʤ/, suggesting that these might be considered unit segments rather than clusters. Additionally, of the 39 instances of initial /kw/ and /gw/ taken together, 32 are followed by a low vowel, 6 by /i/ and only 1 by /e/. Similar distributional anomalies are found before the other initial sequences: from 18 instances of /mbl/, /ŋgl/, /kl/ and /vl/ taken together, all but two are followed by a low vowel. The exceptions - *kloku* 'bring out' and *klokwe* 'put across' - could both be seen as showing conditioning by a following labialised consonant.

[81] Allen and Hurd (1972) set up three vowels in a vertical system for the Ndu language Manambu. However, more recent work on this language, while sympathetic to the vertical vowel analysis, considers it to have a larger vowel system (Aikhenvald 2008: 40ff.).

[82] Foley uses the transcription /ɨ/, but I have used /ə/ here to maintain transcriptional consistency throughout this chapter.

an eight-vowel system [a e ə o i ɨ u], it becomes clear on further examination that many of these vowels are not contrastive, and that the language can be analysed as having only one underlying vowel, /ə/.

As regards the high vowels, Comrie (1991: 393f.) argues persuasively that [i] and [u] should be seen as predictable syllabic variants of /j/ and /w/ respectively, marshalling morphological and distributional evidence that these are consonant rather than vowel phonemes. This analysis is reminiscent of Pawley's (1966) treatment of Kalam, where [i] and [u] are seen as vocalic allophones of the consonants /j/ and /w/ respectively. Furthermore, [ɨ][83] can be shown to be epenthetic in Haruai, being used to break up consonant clusters. Comrie (1991: 394f.) sees this as the instantiation of syllabic variants of other consonants: in the same way that [i] and [u] are syllabic variants of /j/ and /w/, so is [pɨ] the syllabic variant of /p/.

With respect to the mid vowels, Comrie (1991: 395f.) argues that most instances of [e] and [o] could be seen to reflect underlying /əyə/ and /əwə/ respectively, although he notes that there are potential difficulties with this analysis and that [e] and [o] might be developing, or have recently developed, phonemic status.[84] The low vowel [a] can be convincingly shown to be the realisation of underlying /əə/, again on the basis of morphological patterning.

This leaves Haruai with only one phonemic vowel, /ə/, making it "the most extreme version of a Sepik-Ramu vowel system". This is a fitting note to conclude this brief examination of minimal vowel systems in Papua New Guinea. The next section looks at descriptions of such vowel systems in North America.

[83] I have largely retained Comrie's transcriptional conventions, although preferring /ə/ to his /ö/. However, it would also be possible to transcribe the lone vowel of Haruai as /a/, with Comrie's [a] thus becoming [aa], and his epenthetic [ɨ] becoming [ə]. Such a system would render the realisations [e] and [o] from /aja/ and /awa/, below, more natural, and the derivation of [aa] from /aa/ more transparent, as well as according with the transcriptional conventions of this chapter. This is discussed further in 2.3.

[84] Including /e/ and /o/ as phonemes, and transcribing the central mid vowel as /a/, as suggested above, would make the Haruai vowel system effectively the same as that which occurs in Kalam. Pawley (1966: 30f.) considers [i] and [w] to be allophones of /j/ and /w/ respectively, and describes three full vowels /a e o/. Further to this there are predictable vowels in Kalam, much as there are in Haruai under Comrie's analysis (see Blevins and Pawley 2010).

2.2.5. Languages of North America

While I have found no unambiguous examples in the Americas of languages with minimal or vertical vowel systems, there have been a number of descriptions which do fall under the definition of a minimal vowel system adopted in this survey. Below, the Caddoan language Wichita, which has been analysed as having a vowel system with three members /a e i/ (Rood 1975), is examined first, in 2.2.5.1, after which the Upland Yuman languages, which are suggested as a parallel to Northwest Caucasian languages in S. R. Anderson (1978), are covered in 2.2.5.2, and finally the vowel system of Nuxálk (Nater 1984), also known as Bella Coola, is explored in 2.2.5.3.

2.2.5.1. Wichita

A minimal vowel system has been claimed for the Caddoan language Wichita. While Garvin (1950: 179) suggests that Wichita has a vowel system /a e i u/, a patterning which is not infrequent in the languages of North America, Rood (1976: 229ff.) claims that Garvin's /u/ is a result of his "overhearing" /a/ in the environment of /w/. This would leave Wichita with a three vowel system, /a e i/, with however, three degrees of phonemic length. As regards the three members of this system, Rood says that /i/ has centralised allophones in free variation and that the allophones of /e/ can be as low as [æ]. However, the same author does consider /u/ to be an underlying phoneme at one level of analysis, with absolute neutralisation of /u/ and /i/ in the surface phonology, setting up /u/ → /i/ as a derivational rule.[85]

The phonology of Wichita is unusual, to say the least, both as regards its consonant system and its vocalism. Unfortunately, Wichita is now silent,[86] so further research into its phonology is difficult at this point in time. However, it appears to have a minimal vowel system only under one interpretation, and only at one level of analysis. For this reason, it cannot be considered to have a minimal vowel system in the sense understood in this chapter.

[85] See also Rood (1975: 335f.).
[86] In the sense used by Hinton (2001: 413). Some prefer term *sleeping*, used by the artist L. Frank Martinez, with similar meaning.

2.2.5.2. Upland Yuman languages

In his paper examining the theoretical consequences of the analysis of Kabardian given in Kuipers (1960), S. R. Anderson (1978) suggests that the Upland Yuman languages[87] might have vowel systems of the same type. Such an analysis is not at all apparent in earlier structuralist work on those languages, such as that of Seiden (1963: 1) for Havasupai, or Joel (1966: 9) for Paipai.

While Redden (1965: 2ff.) considers Walapai to have a five vowel system /a e o i u/, his subsequent discussion of the phonology of that language is interesting. Firstly, he states that /e/ and /o/ are "much less frequent than /i/, /a/, and /u/".[88] Secondly, in his discussion of the acoustic properties of Walapai vowels, he notes that it has a very "compact vowel triangle, and there are many centralised allophones". In particular, the allophony of /a/ strays very high into the vowel triangle and 53% of all vowels fall into the centralised part. This is likely what Wares (1968: 29) is referring to when he says "high and mid vowels are normally pronounced with an open articulation". This situation is reminiscent of the centralised vowels of Australian languages, discussed in 2.2.3, above.

While the descriptions mentioned above are not particularly suggestive of minimal vowel systems, closer inspection raises some doubts. In a short but stimulating paper, Shaterian (1976: 130f.) argues that "by insisting on a strict vowel-consonant dichotomy, one will always fail to capture the phonological reality". He argues that each Yavapai consonant must have a syllabic representation. To achieve syllabicity a consonant "scans" the one to its right and if that consonant is capable of sustaining a syllabic peak then it is copied and syllabified. He argues that [i] and [u] are the syllabic copies of /j/ and /w/ respectively, that [a] is the syllabic realisation of /h/, and that syllabic /ʔ/ is realised as a [ə], harmonising with the vowel of the following stressed syllable in careful speech.[89]

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[87] Namely , Havapai, Havasupai, Yavapai, and Paipai, the first two perhaps being varieties of the same language.

[88] Shaterian (1983: 51) points out that many instances of [e] and [o] in Yavapai can be derived from /i/ and /u/ in reduced stress positions and that [e] may reflect underlying /a/ in a palatal environment. See also Hardy (1979: 31ff.) for the development of /e/ and /o/ historically in the Upland Yuman languages.

[89] This idea is developed in more detail in Shaterian (1983: 216ff.).

The vowel preceding a stressed syllable tends to be particularly short in Upland Yuman languages (see Wares 1968: 22f.) and Kroeber (1943: 24) remarks that the pronunciation of Walapai is "slovenly". There are also cases of the glottal stop alternating with unstressed vowels (Fọlárìn 1988: 37) and a high frequency of schwa epenthesis (Shaterian 1983: 52ff.). Some of these remarks are reminiscent of those which one often sees in descriptions of languages with minimal vowel systems.

Whatever the synchronic situation, it seems entirely possible that a minimal vowel system existed at an earlier stage of the Yuman languages. While Langdon (1976: 146) reconstructs three vowels for Proto-Yuman, Langdon (1996: 97) points out that *a is especially common in the reconstruction of Proto-Yuman and that the number of "solid reconstructed roots with *i and *u shrinks" on closer examination. She specifically compares this distribution to reconstructions of Indo-European and wonders if it might be an artefact of how historical reconstruction is carried out.

In all, the Upland Yuman vowel systems are not minimal in the sense used here and all the sources I have come across seem to agree on this point. Kozlowski (1976: 143) and Hinton (1980: 322) list five phonemic vowels with two degrees of length for Havasupai while Shaterian argues for five phonemic vowels in Yavapai (1983: 50). Furthermore, it is worthy of mention that they are some of the few languages on earth which have also been analysed as having three degrees of phonemic vowel length (Shaterian 1983: 43). The fact that three degrees of vowel length have also been claimed for Wichita, discussed above, may point to the difficulties in describing languages which were long considered to "violate[...] all sorts of purported universals" (Rood 1975: 336). Another North American language which falls into this category, although for different reasons, is Nuxálk, dealt with below.

2.2.5.3. Nuxálk

The Salishan language, Nuxálk, more often referred to in the linguistic literature as Bella Coola, has also been analysed as having a minimal vowel system. While S. Newman (1947: 131) considers it to have the vowel system /i a u/,[90] under the analysis

[90] See also Davis and Saunders (1997).

of Nater (1984: 3ff.) there is only one vowel in the language, /a/.[91] The other vowels, [i] and [u], are claimed to be in near-complementary distribution with /j/ and /w/, respectively, and to be related to the latter as /m n l/ are to their syllabic counterparts. This leads the author to declare that "in view of the phonetic structure of Bella Coola words, one cannot make an absolute distinction between 'vowels' on the one hand, and 'consonants' on the other".

In spite of this assertion, one could argue that /i/ and /u/ are still phonemic in Bella Coola in Nater's description. Indeed, the parallel behaviour of the sonorants would suggest phonemic status also for the vowels. Galloway (1989: 98) seems to consider the latter to be phonemic under Nater's analysis and that is my impression too. It is telling that in the frequency tables of the grammar /i/ and /u/ are counted separately from /j/ and /w/ (Nater 1984: 27).

Notwithstanding the fact that Nuxálk may thus not have a minimal vowel system under the terms defined in this chapter, there is no doubt that it is interesting for the more general discussion on minimal vowel systems. The reason for this is that there can be words, or even sentences, without any vowels, or indeed, any sonorants either, e.g. *tq'* [tqˀ] 'to arrive by boat, to go ashore' (Nater 1990: 134; Sylak 2011: 4), *lhxwlhtscw* [ɬχʷtɬtsxʷ] 'you spat on me' (Idsardi 1990: 1).

These data create difficulties for models which hold that the syllable is a phonological universal, and there have been a number of different approaches to analysing them in the phonological literature. S. Newman (1947: 132) states baldly that "there are no syllables in Bella Coola, and no phonemically significant phenomena of stress or pitch associated with syllables or words". Hockett, at the other extreme, recognises syllables, but defines them purely on the basis of their onsets, as an "onset-only" type of syllable (Hockett 1955: 57f.). Other analysts have taken different approaches. Bagemihl (1991: 590) considers Nuxálk to have a quite unremarkable syllable structure, maximally CCVVC, arguing that many segments must be considered "syllabically unaffiliated"[92] and using evidence from reduplication processes to argue

[91] According to Galloway (1989: 97), Nater (1984) is based largely on the same author's PhD dissertation (Nater 1983), written under the supervision of Aert Kuipers. As well as being an expert in Salishan languages, Kuipers wrote the vowelless analysis of Kabardian (Kuipers 1960) discussed in 2.2.1, above.

[92] It is argued therein that segments can rec*EIV*e phonetic implementation once they are attached to a mora, attachment to a syllable being unnecessary in Nuxálk (Bagemihl 1991: 636).

against obstruent syllabicity.[93] Idsardi (1990: 13ff.) builds on the analysis of Bagemihl (1989), but distinguishes two types of syllabification: "core" syllabification, with a maximum CVR syllable, and "phonetic" syllabification. Bagemihl (1998: 85) further claims that no root in Nuxalk can have more than two, maximally bimoraic, feet.

These questions should be discussed in the context of other languages in which syllables without vowels or sonorants appear to occur, such as Tashlhiyt Berber (Dell and Elmedlaoui 1985) or the Mon-Khmer languages mentioned by Bagemihl (1991: 594). In a series of recent papers, G. Schwartz (2015) has argued that it is possible to model Tashlhiyt Berber syllabification without reference to syllabic peaks. His approach avoids explicit reference to a sonority hierarchy, therefore avoiding the problems outlined in encoding sonority into synchronic phonology (cf. Ohala 1992; J. Harris 2006).

While languages such as Nuxálk and Tashlhiyt Berber may not have minimal vowel systems under the definition adopted in this chapter, they are relevant to the discussion of the theoretical implications of minimal vowel systems in 2.3, below. However, it is now time to turn to a language with a very different vowel system and phonological structure, the Austronesian language, Marshallese.

2.2.6. Marshallese

Marshallese is a Micronesian language belonging to the Oceanic group within the broader Austronesian family of languages. It has been analysed as having both a vertical vowel system and widespread colour contrasts in its consonant system, much like Modern Irish. In fact, the parallels in terms of phonological patterning between the two languages makes Marshallese a particularly important point of comparison for analyses of Irish.

[93] The general argument against the possibility of obstruent syllabicity in Bagemihl (1991), itself relying on a longstanding phonological assumption (Trubetzkoy 1939: 198; Chomsky and Halle 1968: 354), has been decisively challenged by descriptions of the neighbouring Wakashan language Oowekyala. Howe (2001) uses similar reduplication data as that mentioned above to show that syllables containing only one or two obstruents are indeed possible in that language, provided the second of the two obstruents is a fricative. As regards this latter constraint, cf. Sylak (2011) for Nuxálk.

The recognition of vertical vocalism in Marshallese phonology can be traced to Bender (1968), who discovered it on the basis of distributional anomalies in the patterning of vowels. Bender (1968) uses the cover symbols J, K and Q to define three series of consonants in Marshallese. While the published sources differ on some minor details of the consonant system, for the purposes of the following discussion I use instead the cover symbols Y, X, and W, with the following consonants belonging to each series: Y /pʼ tʼ mʼ nʼ lʼ rʼ j/; X /p t k m n ŋ l r ɯ/; W /k° n° ŋ° l° r° w/.[94] The Marshallese tradition describes the Y-colour series as "light" and the others as "heavy" (Bender 1968: 34).

According to Bender, there are twelve simple phonetic vowel sounds in the language, but they do not all occur in all environments. The vowels [i ɪ e ɛ] only occur between consonants of the Y-series. Similarly, the vowels [ɯ ɤ ʌ a] occur only between consonants of the X-series, while the vowels [u ʊ o ɔ] are found only between consonants of the W-series.

This is clearly a case of complementary distribution, which led Bender (1968: 20ff.) to analyse Marshallese as having four phonemic vowels, which he argued were distinguished solely by height, although he suggests that one of the four (the high-mid vowel) was likely not to be contrastive. The analysis of Choi (1992) has only three vowels, whereas Willson (2003) writes four vowels, distinguished on the two axes of height and ATR, rather than by height alone. In what follows, a four-way distinction is assumed, with the phonemic vowels transcribed /a ə ï ɨ/,[95] with the possibility left open that /ï/ might not be contrastive.

In the table below, the phonetic vowels and diphthongs which occur in Marshallese are shown, with the transcription conventions reflecting Hale and Reiss (2008: 145) and Willson (2003: 2-3). The phonemic vowels are given in the leftmost column, their allophones in given environments in subsequent columns. The top row schematises these environments, with W, X, and Y representing any consonant of the associated series.

[94] Following the transcriptional conventions used for Old Irish in this work, palatality is marked with a following prime /C′/ and labiality with a following /C°/, velarity being left unmarked.

[95] In Hale (2000) and Hale and Reiss (2008) symbols for a cup of coffee, a telephone, yin-yang and a soccer ball are used for these four vowels. While this has the advantage of drawing the reader's attention away from the phonetic realisations of the given phonemes, throughout this thesis the phonemes of a vertical vowel system are transcribed with IPA symbols for central vowels, regardless of whether or not the phonetic values these symbols are associated with ever surface phonetically.

Table 6. The vowels of Marshallese (after Willson 2003: 3)

V	Y_Y	Y_X	Y_W	X_Y	X_X	X_W	W_Y	W_X	W_W
/ɨ/	i	iɯ	iu	ɯi	ɯ	ɯu	ui	uɯ	u
/ɪ/	ɪ	ɪɤ	ɪʊ	ɤɪ	ɤ	ɤʊ	ʊɪ	ʊɤ	ʊ
/ə/	e	eʌ	eo	ʌe	ʌ	ʌo	oe	oʌ	o
/a/	ɛ	ɛa	ɛɔ	aɛ	a	aɔ	ɔɛ	ɔa	ɔ

The vertical vowel analysis of Marshallese, summarised in the table above, is not merely a phonological abstraction, but also a phonetic reality, verified by empirical study. In an acoustic analysis of CVC sequences in Marshallese, it was found that |F2| and its trajectory could be modelled without reference to a vocalic |F2| target (Choi 1992, 1995: 324). In other words, in Marshallese, |F2| is a property of consonants and not of vowels, and in cases where a vowel occurs between consonants of different quality, the second formant of the vowel shifts from that associated with the first consonant to that associated with the second, without ever reaching a steady state.

Apparent difficulties in the generalisations made above about Marshallese vocalism are words which begin and end in a vowel. These were reinterpreted by Bender (1968: 21) as respectively beginning and ending with a glide consonant, such that *oñ* [oŋ^{w}] 'homesick' could be transcribed phonemically as /wəŋ˚/ or *āl* [ɛl^{j}] 'shave' as /jal′/. Bender describes the glide in the X series as a "zero consonant" and transcribes it with /h/, while Willson (2003) uses instead /ɯ/. In terms of the latter transcription a form such as *ūḷ* [ɯl^{ɣ}] 'fin' would thus be transcribed /ɯɨl/. The term "zero consonant" is quite fitting for cases such as this, but I have preferred instead the term *abstract consonant*, as used in the description of Old Irish laid out below (see 3.2.2.3). For the abstract consonants of Marshallese, as for those of Irish, the symbols /∅′ ∅ ∅˚/ are used in lieu of /j ɯ w/ below, reflecting better the fact that the glides are never realised as contoids, but rather represent abstract |F2| targets (Choi 1992: 70).

It is not just initial and final vowels which can be seen to contain zero consonants, but also phonetically long vowels can be reanalysed as sequences /V∅˜V/, e.g. *nāj* [nʲɑ:tʲ~nʲɛaaɛtʲ][96] 'future' /n′a∅at′/. Sequences of differing surface vowels can also be explained as having a medial zero consonant, e.g. *aō* [aɤ] 'mine' /∅a∅ï∅/.

[96] The first transcription follows Bender (1968: 23), the second the logic of Willson (2003: 7) although she transcribes [nʲeaɯaetʲ] here, probably as a result of a typographical error.

A consequence of the vertical vowel analysis of Marshallese, and the associated introduction of abstract consonants, is that all words must begin and end with a consonant. Words must begin with a CV sequence and end with a CVC one, and medially, the initial consonant of a CV syllable functions also as the coda of the previous CV sequence for the purposes of conditioning vowel quality. The canonical syllable structure in Marshallese is thus effectively CVC, although the coda consonant might frequently be considered ambisyllabic in medial position. Marshallese only allows consonant clusters which agree for both primary and secondary localisation. Clusters which do not agree in their secondary localisation show regressive assimilation of quality (Willson 2003: 6). These facts concord nearly entirely with those observed in Old Irish.

As far as I can determine, the only analysis of Marshallese since Bender (1968) which does not accept the basic insight of that paper, i.e. that Marshallese has a vertical vowel system, is Zewen (1977: 28-31). Zewen instead sets up a vocalic system for Marshallese containing ten phonemic vowels, some of which have a number of allophones, and six diphthong. However, he does not present any arguments in favour of his alternative, nor any critique of the vertical vowel analysis.

Although Bender (1968: 30f.) transcribes the X-quality series without a diacritic, he also questions its status as "unmarked|. In particular, he cites frequency data which suggest that the Y-series is more frequent for some manners and localisations. It is quite likely that there is no unmarked series in the three series of Marshallese consonants and that all series are equally marked. I have made similar arguments about the supposed markedness of Modern Irish slender consonants (C. Anderson 2013; pace Hickey 2012; Iosad and Ní Chiosáin 2016).

In all, Marshallese can be considered one of the best researched and unequivocal instances of a language with a vertical vowel system and is a particularly pertinent point of comparison for the purposes of this thesis, seeing as many of the phenomena which occur in Marshallese are similar to those which occur in Irish. However, discussion of this point must be postponed for now; the next section examines instead minimal vowel systems in Chadic languages.

2.2.7. Central Chadic languages

Minimal vowels systems are extensively described for Chadic languages, particularly for the Central Chadic or Biu-Mandara branch. These languages have quite complex phonologies, and researchers working on them have developed a range of analytical conventions that are not often found in phonological descriptions of other languages. In particular, many linguists working on Chadic languages speak about prosodies extending over a given phonological domain, be it the word or the syllable, affecting both consonants and vowels within that domain (Roberts 2001).[97] These prosodies are conventionally labelled as Y-prosody, corresponding to distinctive palatalisation, and W-prosody, corresponding to distinctive labiovelarisation (Barreteau 1983: 273; Wolff 2004: 44f.).[98]

While grammars of Central Chadic languages until the 1960s generally posit relatively full vowel systems, with five to seven members, it became apparent to linguists working with these languages that alternative analyses might better deal with the facts. While C. Hoffmann (1963: 18ff.) posits six phonemic vowels in his grammar of Margi (A3),[99] the same author two years later proposed a system relying on prosodies for Higi (A3) (C. Hoffmann 1965). This was followed several years later by two influential papers by Mohrlang (1971, 1972), which rely on a prosodic analysis and propose a vertical vowel system with three members, /a ə ɨ/, for the same language.

In his work on Gude (A8) phonology, Hoskison (1975, 1983: 9-21) describes a three-way contrast between plain, palatalised and labiovelarised consonants, with palatalised counterparts to all of the plain consonants and labiovelarised counterparts to the non-coronal ones (Hoskison 1975: 7ff.).[100] Hoskison specifically mentions Northwest Caucasian languages when he posits two short vowels, /a/ and /ə/, for Gude, saying that these vowels "assimilate the colouring of contiguous consonants".

[97] The use of *prosodies* in the Firthian sense in the description of minimal vowel systems is discussed further in 2.3.2.
[98] Some scholars also include prenasalisation as a distinct prosody, e.g. Barreteau (1983: 256f.).
[99] Codes in brackets refer to the classification of a given language within Chadic, according to P. Newman (1977). All languages cited belong to the Central group unless indicated otherwise.
[100] Only the consonant /ɣ/ has neither a palatalised nor labiovelarised counterpart (Hoskison 1975: 11, 16). In Hoskison (1983: 11) it is stated that rare instances of labiovelarised coronal stops also occur.

While Hoskison (1975, 1983) considers the colour distinctions between forms to primarily reside in consonants, with vowel quality conditioned by these consonants,[101] he provides verbal derivations which show palatalisation and labiovelarisation functioning across domains larger than the segment (Hoskison 1975: 39ff.), providing rules as to which segments are affected by palatalisation or labiovelarisation in a given form.[102] Subsequent scholars tended to develop this approach by attributing colour distinctions not to the consonant, but to a larger phonological domain, such as the syllable, the morpheme, or the word. This is referred to as the *prosodic approach* in Chadic phonology.

In his grammar of Lamang (A4), Wolff outlines this prosodic approach, while putting forward two alternative analyses of the vowel system: one with four monophthongs, /a ə i u/, the other with three monophthongs and a diphthong, /a i u aY/, while recognising that at a more abstract level of analysis, the underlying vowels could be reduced to two, /a/ and /ə/, or perhaps even to only one, /a/, at least historically (Wolff 1983: 46). In the same year, Barreteau produced a paper reanalysing Mohrlang's (1971, 1972) work on Higi (A3) as having a two-member vertical vowel system, /a ə/, rather than a three-member one (Barreteau 1983). By and large, this approach has been followed by subsequent researchers, with isolated exceptions.[103]

It thus appears that practically all of the Central Chadic languages[104] can be analysed in similar terms, with prosodies of palatalisation and often labiovelarisation

[101] See Barreteau and Jungrathmayr (1982) for a similar analysis of Somrai (East Chadic A1), with, however, three phonemic vowels in a vertical system.
[102] See also Hoskison (1974).
[103] The main exception, as far as I can determine, being Zygmunt Frajzyngier, whose grammar of Gidar (B1?) posits the vowel system /a ə i u/, with "vowel harmony" processes (Frajzyngier 2008: 49, 60ff.). In contrast, Schuh's work on Gidar describes two phonemic vowels, /a/ and /ə/, and both palatal and labial prosodies (Schuh 1984: 11, 13). Schuh (2010: 126ff.) convincingly defends his analysis over that of Frajzyngier in a review of the latter's grammar of the language, arguing against the notion of vowel harmony in Central Chadic. This view is clearly shared by other scholars: in her description of Tangale (West Chadic A2), Kidda (1993: 14) states "Tangale is the only Chadic language known to have a vowel harmony system" (cf. also Jungraithmayr et al. 1991), speculating that this is an innovation possibly caused by contact with neighbouring Niger-Congo languages.
[104] Chadic languages not in the Central branch have not generally been analysed as having minimal vowel systems. An exception is Miya (West Chadic B2), which Schuh (1998: 18ff.) considers to have the vowel system /aa a ə/. Elsewhere, larger vowel systems are generally described. Hausa (West Chadic A1) has five vowels /a e o i u/, which occur both long and short, according to the most reliable descriptions (Lindau-Webb 1985: 161ff.; Jungraithmayr and Möhlig 1986: 6f.; P. Newman 1997: 541; 2000: 398; Schuh and Lawan 1999: 90; pace Smirnova 1983: 6). The Ron language (West Chadic A4) similarly has five vowels /a e o i u/, which can occur long or short (Jungraithmayr 1970: 17), although Seibert (1998: 13f.) notes that palatalisation occurs before /e/ and that /o/ can also be pronounced [wa] in that language. For Goemai (West Chadic A3), Hellwig (2011) makes a segmental analysis of palatalisation and

which act on a phonological domain larger than the segment, affecting both consonants and vowels, the latter class typically being reducible to two terms.[105]

However, the languages of the group appear to differ in terms of their prosodies and surface vowel systems. As regards the former dimension, some languages can be seen as having only palatalisation, some as having both palatalisation and labialisation, and in some the two prosodies can occur together. Examples of the former are E. Hoffmann's analysis of Bana (A3) and Viljoen's of Buwal (A7), where palatalisation is treated as a prosody while labialisation is considered a property of individual consonants, given that it is confined to the velars (E. Hoffmann 1990: 39f., 57ff.; Viljoen 2013: 56).[106] In contrast, in the analysis of Higi given in Barreteau (1983: 265ff.) both Y-prosody and W-prosody occur and indeed the two can occur simultaneously, affecting a far broader range of surface consonants. This is shown for the peripheral consonants of the language in the first of the tables below, and for the central consonants in the second.[107]

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labiovelarisation and lists four phonemic short vowels, /a ə i u/. Ngizim and Bade (West Chadic B1) have /a i u/ with a possibly phonemic length distinction and emergent /e o/ from loanwords (Schuh 1971: 7, 20ff.; 1978: 249). While Kera (East Chadic A3) has been analysed as having a six vowel system /a e o i ɨ u/ (Pearce 2003: 5ff.), most East Chadic languages are generally considered to have five vowel systems /a e o i u/ (Lovestrand 2011: 10, 2012: 26). The material I have been able to access suggests that the same is true of the Masa group, e.g. Shryock (1995: 5) for Musey and De Domincis (2001) for Masa.

[105] Occasionally, additional vowel contrasts might have become phonemicised. Ruff (2005) argues that Lagwan (B1) has five vowels /a e o i u/, but that vowels other than /a/ are emergent phonemes, which contrast fully only in final position. In her description of Bana (A3), E. Hoffmann (1990: 81ff.) also argues that /e/ is phonemic in the language, as well as /a/ and /ə/, although it is both infrequent outside of plural formations, and is often in free variation with /a/. This vowel system, /a e ə/ is highly unusual from the typological point of view and must be distinguished from the transcription /a e ə/ in Barreteau's work on Mofu-Gudur, where it is made clear that the opposition between central /a/ and front /e/ is a transcriptional convention for the prosodic opposition of palatalisation and not a segmental distinction (Barreteau 1988: 302f.). For Uldeme (A5), Provoost and Koulifa (1987: 7ff.) describe six vowels, but have considerable difficulty in describing their distribution. However, for the same language, Colombel (1986: 219ff.; 2005: 23ff.) describes four vowels /a e ə i/. It is probable that this might be reduced to /a ə/ under rigorous analysis, such as that carried out by Barreteau (1988) for Mofu-Gudur. The /a e ə i/ systems of Bana and Uldeme bring to mind the varying analyses of Anindilyakwa discussed in 2.2.3, above. Kirya (A3) and Bura (A2) have been analysed as having six vowels (C. Hoffmann 1955: 13ff.; Blench and Ndamsai 2007: 76; Blench 2009: 6), but the first of these studies predates the same author's own adoption of the prosodic framework, while the second is orientated towards a practical orthography and the third is no more than a sketch in which the author acknowledges that these vowels may not all be phonemic. Mouchet (1966: 49ff.) gives nine vowels for Daba (A7), but mentions productive vowel assimilation in the language. As this is an early study, further research, taking the prosodic approach into consideration, would be desirable.

[106] In Mafa (A5) only coronals have palatalised allophones and only velars have labialised ones (Barreteau 1987: 168). This distribution brings to mind the theory of consonantal representation developed by Weijer (1996)

[107] Barreteau (1983) analyses (pre-)nasalisation as a distinct prosody, but I have here reinterpreted nasalised consonants as independent segments. For reasons of space, I have also generalised superscripts for prosodic effects, where the original author writes entire segments.

Table 7. The peripheral consonants of Higi (after Barreteau 1983: 265ff.)

Prosody																
∅	w	ɓ	b	p	^{m}b	^{m}p	m	v	f	ʔ	g	k	^{ŋ}g	^{ŋ}k	ŋ	x	ɣ
Y	-	ɓ^{j}	b^{j}	p^{j}	^{m}b^{j}	^{m}p^{j}	m^{j}	v^{j}	f^{j}	g^{ʔj}	g^{j}	k^{j}	^{ŋ}g^{j}	^{ŋ}k^{j}	ŋ^{j}	x^{j}	ɣ^{j}
W	w^{j}	ɓ^{w}	b^{w}	p^{w}	^{m}b^{w}	^{m}p^{w}	m^{w}	v^{w}	f^{w}	g^{ʔw}	g^{w}	k^{w}	^{ŋ}g^{w}	^{ŋ}k^{w}	ŋ^{w}	x^{w}	ɣ^{w}
YW	-	-	-	-	-	-	-	-	-	^{b}g^{ʔj}	^{b}g^{j}	^{p}k^{j}	^{m}g^{j}	^{m}k^{j}	^{m}ŋ^{j}	^{w}x^{j}	^{w}ɣ^{j}

Table 8. The central consonants of Higi (after Barreteau 1983: 265ff.)

Prosody																
∅	j	ɗ	d	t	^{n}d	^{n}t	n	ɬ	ɮ	ʤ	ʦ	^{n}ʤ	^{n}ʦ	s	z	l	r
Y	-	ɗ^{j}	d^{j}	t^{j}	^{ɲ}d^{j}	^{ɲ}t^{j}	n^{j}	ɬ^{j}	ɮ^{j}	ʤ	ʧ	^{ɲ}ʤ	^{ɲ}ʧ	ʃ	ʒ	l^{j}	-
W	^{w}j	^{b}ɗ	^{b}d	^{p}t	^{m}d	^{m}t	^{m}n	^{w}ɬ	^{w}ɮ	^{b}ʤ	^{p}ʦ	^{m}ʤ	^{m}ʦ	^{w}s	^{w}z	-	^{w}r
YW	-	bɗ^{j}	^{b}d^{j}	^{p}t^{j}	^{m}d^{j}	^{m}t^{j}	^{m}n^{j}	^{w}ɬ^{j}	^{w}ɮ^{j}	^{b}ʤ	^{p}ʧ	^{m}ʤ	^{m}ʧ	^{w}ʃ	^{w}ʒ	-	-

As regards allophony in the vowel system, a number of different patterns appear to emerge across the Central Chadic languages. The issue is covered in detail in Barreteau (1987), who claims that phonetically at least eight distinct vowel qualities appear in languages of the group, while generally only two vowels, or sometimes only one, can be considered phonemic. These eight allophones can be illustrated by Cuvok (A5). The data in the table below are taken from Ndokobaï (2003: 37-46).

Table 9. The vowels of Cuvok (after Ndokobaï 2003: 37-46)

Vowel	Y-prosody	WY-prosody	∅-prosody	W-prosody
/ə/	[i]	[y]	[ə]	[u]
/a/	[ɛ]	[œ]	[a]	[ɔ]

Langermann (1994: 27ff.) describes a practically identical system of allophony for Hdi (A3), only that [œ] does not occur as an allophone of /a/ and the low vowel shows free variation between [ɛ] and [e] when under Y-prosody.[108] The situation in Moloko (A5) is very similar, only that rather than [y], the high vowel surfaces as [ʊ~u] when under WY-prosody, and high vowels are "lax" [ɪ ʊ] rather than "tense" [i u]. The latter two vocoids do occur as the combination of /ə/ with the semivowels /j/ and /w/ respectively (Bow 1997b: 9ff.).

[108] Langermann argues that there is a dominance relationship between Y-prosody and W-prosody in Hdi, meaning that when the two co-occur, one prosody is dominant. When Y-prosody is dominant, the high vowel surfaces as [i] with rounding of the preceding consonant, e.g. /^{yw}skə/ [sk^{w}i] 'thing'. When W-prosody is dominant /ə/ surfaces instead as [y], with either a preceding [u] or labialisation of the consonant, e.g. /^{wy}sət/ [suyt~s^{w}yt] 'indigeneous broom' (Langermann 1994: 31)

In Hdi, both W-prosody and Y-prosody operate at the level of the syllable (Langermann 1994: 45), while in Moloko, they operate at the level of the word (Bow 1997a: 9, 11). In Buwal (A7), on the other hand, only Y-prosody exists and it operates at the level of the word, labiovelarisation being a property of consonants (Viljoen 2013: 50). The allophony she describes for that language is slightly different, with labialised velars and the glide /w/, conditioning distinct reflexes in surrounding vowels, as is shown in the table below.[109]

Table 10. The vowels of Buwal (afterViljoen 2013: 50)

	Y-prosody						∅-prosody	
	_/j/		with /K^{w}/[110]	_/w/	/w/_		_/j/	with /Kw w/
/ə/[111]	[i]	[ɪ]	[ʊ~u]	[ʏ]	[ʊ]	[ə]	[i]	[ʊ]
/a/	[e]	[ɛ]	[ɛ~œ~o]	[e]	[ɛ]	[ɐ]	[ɐ]	[ɐ~o]

The Buwal data is interesting for two reasons. Firstly, the two vowels are not conditioned in the same way: the quality of the allophones of /a/ fairly consistently reflect the underlying prosody, while those of /ə/ show far greater conditioning effects caused by adjacent consonants, as is shown by the varying reflexes of the high and low vowel in the environment of /w/. Secondly, the differences between environments before /w/ and after it, are similar to those described for Ndu languages such as Iatmul or Abelam, discussed in 2.2.4.1, in that tense allophones are found before the glide and lax ones after it.

In Hoskison's (1975) analysis of Gude (A8), the colour distinctions are considered to pertain to consonants, rather than to a larger phonological domain. Adjacent consonants then condition the colour of the vowels. This is set out in the table below, with ∅ standing for a plain consonant, Y for a palatalised one, and W for a labiovelarised one.

Table 11. The vowels of Gude (after Hoskison 1975: 23ff.)

V	Y_Y	Y_∅, ∅_Y	∅_∅	Y_W, W_Y	W_∅, ∅_W	W_W
/ə/	[i]	[ɪ~ɨ]	[ɨ]	[ɪ~ɨ~ʊ]	[ɨ~ʊ]	[u]
/a/[112]	[e]	[ɛ~a]	[a]	[a]	[a~ɔ]	[o]

[109] Viljoen (2013: 49) explicitly situates Buwal in the context of other languages with vertical vowel systems, such as Kabardian, explored in 2.2.1, and Marshallese, discussed in 2.2.6.
[110] Here /K^{w}/ stands for any labialised velar.
[111] Viljoen uses /∅/ here as she considers schwa to be epenthetic in Buwal. This matter is discussed further below.

As can be seen in the table above, there is a rich system of allophonic variation in Gude, with tenser and higher allophones between consonants of the same colour, and more free variation between consonants of different colour. While the low vowel tends towards [a] in the latter case, the high vowel shows substantial variation (Hoskison 1975: 24).[113] This type of allophony has a great deal in common with that present in Modern Irish, as discussed in 1.3.2.[114]

In other Central Chadic languages vowel allophony works slightly differently. In Mbuko (A5), /ə/ remains unaffected by Y-prosody and W-prosody, while these transform /a/ into [i] and [u] respectively. However, both /a/ and /ə/ are affected by contiguous labiovelars or glides (Gravina 1997: 10-16; 1999: 50ff.; 2001: 121f.). In Muyang (A5), Smith (1999: 11) claims an even wider range of allophony than that described for other Central Chadic languages, with raising giving /a/ a quite astonishing number of allophones under prosodic influence, laid out in the table below.

Table 12. The vowels of Muyang (after Smith 1999: 11)

Vowel		Y-Prosody	YW-prosody	∅-prosody	W-prosody
/ə/		[ɪ]	[ʏ]	[ə]	[ʊ]
	Raised	[i]	[y]		[u]
/a/	Semi-raised	[e]	[ø]	[a]	[o]
	Full	[ɛ~æ]	[œ]		[ɔ]

While I have transcribed /ə/ in the table above, Smith (1999: 11) transcribes it /∅/ instead. This is because he considers /ə/ to be epenthetic in Muyang. Epenthetic schwa, used to break up consonant clusters, has been claimed for the Central Chadic languages both historically, e.g. Wolff (2004, 2008) and synchronically, e.g. Barreteau (1987). The notion that the Central Chadic languages could be analysed with only one vowel, /a/, or rather two vowel patterns, a-vocalism and ∅-vocalism, dates at least to Wolff

[112] Hoskison (1975) uses the transcription /ʌ/ for this vowel, which I have changed everywhere to /a/.
[113] There are also long vowels in Gude, which behave somewhat differently than short ones, in that they are resistant to regressive colour assimilation, the high ones surfacing regularly as [iː] after palatalised segments, as [uː] after labiovelarised ones, and as [ɨː] elsewhere (Hoskison 1975: 29ff.). Phonetic [iː] and [uː] are also the reflexes of /əjə/ and /əwə/ respectively and surface diphthongs [ei] and [ou] derive from /ajə/ and /awə/. The long vowel [aː] is resistant to the colouring effect of surrounding consonants.
[114] The transition glides discussed by Hoskison (1975: 30) are also reminiscent of those of Modern Irish.

(1983), but the synchronic arguments for a one-vowel analysis are laid out particularly clearly in Daniel Barreteau's description of Mofu-Gudur (A5) (Barreteau 1988).[115]

In Mofu-Gudur there appears to be a contrast between /a/ and /ə/ only in internal open syllables. Initially and finally the vowel is always /a/, while in internal closed syllables the vowel is always /ə/. The near-complementary distribution raises questions about the predictability of schwa, and three possible analyses present themselves: either /ə/ is underlying; or it is epenthetic; or it is the realisation of /a/ before underlying geminates. The geminate solution is tempting, as the vowel tends to be very short and the following consonant often has a syllabic copy to its left.[116] However, there are also normal surface geminates in the language, which makes this solution somewhat problematic. As regards the solution with underlying /ə/, Barreteau shows that the tone of /ə/ in an open syllable is predictable from the tone of surrounding syllables, meaning that it has no distinctive value, and causing him to settle on the second solution, i.e. schwa is epenthetic in Mofu-Gudur. The conditioning of this epenthesis is somewhat complex and Barreteau does not manage to establish precise rules, but generally RT clusters do not epenthesise, while TR clusters do.[117]

By writing a theory of sonority into the synchronic grammar,[118] not just /ə/, but also /a/ can be shown to be predictable on the basis of phonotactics (Barreteau 1988: 419ff.). Only tone need be marked in underlying forms, with the position of tones determining the realisation of vocoids. Notwithstanding this possibility, Barreteau instead settles on an analysis in which /a/ is underlying, arguing that the rules of epenthesis are insufficiently clear, that this would require morphological boundaries to be pre-established, and that it is typologically unusual to define vowels uniquely by their tone.[119]

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[115] Further discussion may be found in Barreteau (1987), Bow (1999: 37-9), in Viljoen (2009: 39-44), and in Gravina (2014).

[116] An analysis which recalls that of Shaterian (1976: 31) for Yavapai, discussed in 2.2.5, above.

[117] It is possible that modern theories of sonority might help to shed more light on the conditioning of vowel insertion in Mofu-Gudur. More research into this question would be required, but unfortunately falls outside of the scope of this thesis

[118] For arguments against this strategy see Ohala (1992), already mentioned in the discussion of Nuxálk in 2.2.5.

[119] The first argument is valid, which is why more research is a desideratum. The validity of the second would depend on the theoretical proclivities of the individual researcher. The third argument is less convincing: it is already clear that from a phonological point of view Mofu-Gudur is a typologically unusual language, which may well require a typologically unusual analysis.

The subsequent one-vowel analysis relies on four structural tone schemata - LLL, HLL, LHL, LLH,[120] meaning that only the high tone need be marked. Barreteau sees this as on a par with the palatalisation prosody, in that the tone schema applies to the word as a whole. There are two syllable types, (C)CV and (C)CC, the latter surfacing as (C)CVC when word-final. Two rules of epenthesis, pausal and internal, allow surface forms to be derived from underlying ones. The following examples illustrate the relationship between the latter and the former: /^{2x}vr/ → [vár] 'rain', /^{0y}vr/ → [vɛ̀r] 'room'; /^{3x}bla/ → [bə̀(l)lá] 'world', /^{3y}bla/ → [bə̀(l)lɛ́] 'weakness'; /^{3y}zlŋ/ → [zɨ̀(l)lɛ́ŋ] 'panpipes', /^{3y}zalŋ/ → [zɛ̀lɛ́ŋ] 'precipice' (Barreteau 1988: 435).

As regards other Chadic languages, particularly those of the Central branch, a single vowel analysis with epenthetic schwa is followed by Bow (1994, 1997a; 1997b) for Moloko (A5); by Smith (1999) for Muyang (A5); and by Viljoen (2013) for Buwal (A7).[121] Wolff (1983: 225) also argues that reconstructions of Central Chadic should assume just one phonemic vowel /a/. In contrast, other scholars have argued that for specific languages, schwa cannot be considered epenthetic. This is the position taken by Langermann (1991, 1994) for Hdi (A3); by Barreteau (1987: 165-80) for Mafa (A5); by Ndokobaï (2003) for Cuvok (A5); by Gravina (1997; 1999) for Mbuko (A5); by Gravina et al. (2005: 3) for Gemzek (A5); and by Schuh (1984: 13ff.) for Gidar (B1).

The prosodies in Central Chadic languages may be lexically specified, but they also play an important role in morphology. Examples of both lexical and morphological prosodies in Moloko (A5) are shown here, with examples taken from Bow (1997a; 1997b). It should be noted that in Moloko, prosodies apply to the entire word and an epenthetic schwa breaks up consonant clusters. As regards lexical differentiation, the three roots /kra/, /^{j}kra/ and /^{w}kra/ are illustrative. The first, realised [kəra], means 'dog'; the second, realised [kɪrɛ], means 'ten'; while the third, realised [kʊrɔ], means 'stake, post' (Bow 1997a: 10).

As regards the morphological importance of prosodies, verbal nouns in Moloko are formed from verbal roots by the addition of a nominalising prefix /m-/, a suffix /-a/, and the application of Y-prosody to the word. The roots /tsr/ 'climb' and /tsar/ 'taste good' are illustrative of this. The phonemic forms of the two verbal nouns are thus

[120] The tone schemata are indicated in what follows with a superscript 0, 1, 2, or 3, respectively, preceding the word.
[121] While Viljoen (2009) seems a little unsure if schwa can be considered epenthetic in Buwal, Viljoen (2013) is unequivocal.

/ʲmtsra/ ‘climbing’, pronounced [mɪʧɪrɛ], and /ʲmtsara/, realised [mɪʧɛrɛ] (Bow 1997a: 11).

As well as Y-prosody, W-prosody is also important in Moloko morphology. For example, the first and second person plural forms of verbs are characterised by the application of W-prosody to the word and the addition of a suffix /-am/. This can be illustrated with the verbal root /mⁿʤar/ ‘to see’. The first person forms take the prefix /n(a)-/, while the second person forms take the prefix /k(a)-/ (Friesen and Mamalis 2004: 20). This yields first person singular /n-mⁿʤar/ [nəməⁿʤar], first person plural /ʷn-mⁿʤar-am/ [nɔmʊⁿʤɔrɔm], second person singular /k-mⁿʤar/ [kəməⁿʤar], and second person plural /ʷk-mⁿʤar-am/ [kʷɔmʊⁿʤɔrʌm] (Bow 1997b: 9).[122]

The arguments in favour of a prosodic analysis of Central Chadic phonologies, over one relying on vowel harmony, or on colour distinctions pertaining solely to consonants, have been laid out by Barreteau (1987: 166f.). Firstly, palatalisation and labialisation regularly affect the entire word, and not just independent vowels and consonants, although the phonetic manifestation of these prosodies may affect the former more than the latter, or vice versa, depending on the language (see Gravina 2014). Secondly, morphonological evidence shows that prosodies remain very productive in many of these languages. Central Chadic languages can be seen as having “vowel assimilation” rather than “vowel harmony” as they do not show the strict divisions in their vowel system which are common in languages with vowel harmony, nor do they have suffixes which are unspecified for harmonising features (Schuh 2010: 129f.). This analytical issue is discussed in much more detail in 2.3.2, below.

While Wolff (2003) suggests that the prosodies might be a “shallow” innovation, confined to Proto-Central Chadic, there seem to be some indications that they might indeed have to be reconstructed for the Chadic languages in their entirety. Roberts (2009: 134ff.) makes convincing arguments in favour of a prosodic approach to the analysis of Mawa (East Chadic B3) and suggests that it is likely they extended back into Proto-Chadic. Further evidence for this hypothesis comes from recent phonetic studies into Eastern Chadic.

[122] While the two plural forms seem to reflect prefixes with underlying /a/, as are found also in Muyang (Smith 1999: 15), the singular forms appear to reflect a prefix without an underlying vowel, i.e. one that takes an epenthetic vowel. I note that Friesen and Mamalis (2004: 20) list the prefixes without /a/, as /n-/ for the first person and /k-/ for the second person. They give the first and second plural forms [nʊmʊⁿʤɔrɔm] and [kʊmʊⁿʤɔrʌm] here.

Pearce (2003: 11ff.) analyses Kera (East Chadic A3) in terms of three different types of vowel harmony. However, a subsequent acoustic study into Chadic vowel systems revealed phonetic support for the prosodic approach to Chadic vocalism. Gendrot and Adda-Decker (2006) analysed a large corpus of data from eight languages, six Indo-European ones, Mandarin and Arabic, and came to the conclusion that in vowels of shorter duration, |F1| and |F2| values tended to converge on schwa. Put otherwise, the shorter a vowel is, the closer to [ə] is its realisation. Acoustic data from seventeen languages from all branches of Chadic showed the expected convergence in |F1| values, but not the expected convergence in |F2| (Pearce 2008: 119ff.). The lack of reduction on the |F2| axis can be attributed to the fact that a prosody affects a phonological domain larger than the segment. As |F2| is not a property of vowels, shorter duration does not cause a reduction in this variable. In contrast, |F1|, which is a property of vowels, is reduced normally. Pearce (2008: 137) sees this as explicit support for the prosodic approach in Chadic phonology.

2.3. Discussion of the survey

This section discusses some of the results of the survey of minimal vowel systems presented in 2.2, above, and pinpoints useful comparanda for the analysis of Old Irish phonology laid out in chapter 3, below. Subsection 2.3.1 discusses a number of the most striking commonalities shared by the various languages with minimal vowel systems, thus seeking to identify what universals might exist in these systems, and indeed in vowel systems more generally. In subsection 2.3.2, a number of theoretical difficulties in phonology raised by the results of the survey are discussed under the rubric of incommensurability, and specific points of comparison for the subsequent analysis of Old Irish are identified.

2.3.1. Tendencies apparent in the survey

This subsection discusses a number of important tendencies, perhaps even universals, which were observed in the survey of minimal vowel systems presented in 2.2, above.

These tendencies fall into two main types: those related to the distribution of terms within the vowel space; and those concerning the degree to which the vowel space itself can be taken to be a cross-linguistic constant. The distributional issues are dealt with first, in 2.3.1.1, then the question of the size of the vowel space in 2.3.1.2.

2.3.1.1. Distribution of terms in the vowel space

In his survey of vowel systems, Crothers stated a supposed universal of vowel systems: "all languages have /i a u/" (Crothers 1978: 115). The typological survey carried out here decisively refutes this claim. Given the existence of vowelless analyses of a number of languages, as explored above, it is unclear if the existence of a distinct class of vowels is a phonological universal at all. If these analyses are omitted from consideration then it would indeed be possible to state an absolute universal for the world's vowel systems: all languages have /a/.[123]

Of the analyses which posit a distinct class of vowels, there is one apparent exception to this in the survey. Comrie (1991), in his analysis of Haruai, preferes to transcribe the single vowel phoneme of that language as /ə/, with phonetic [a] considered a sequence /əə/. However, this may just be a transcriptional issue: transcribing this sole vowel as /a/ would mean that the phonetic vowel which Comrie writes as [a] would reflect /aa/ and phonetic [e] and [o] the combinations /aja/ and /awa/ respectively. This would permit the epenthetic vowel of Haruai to be transcribed as [ə], and would bring it into line with many of the other minimal vowel systems explored above.

In all languages other than Haruai, where only one vowel is posited, that vowel is transcribed by researchers as /a/. This is the case for many Central Chadic languages, where many analysts distinguish between a-vocalism and ∅-vocalism. However, it is also the position taken by those scholars who accept the epenthetic nature of schwa in

[123] This statement is concise to the point of being imprecise. It would be better to say that where languages have only one *vocalic* term, the allophones of that term tend to cluster in the lower end of the vowel space in such a way that it might be transcribed /a/, and that where languages have more than one *vocalic* term, then at least one of those terms will have exponents that cluster in the lower end of the vowel space. Hence, /e o/ is an unattested vowel system: while vertical vowel systems are possible, it appears that horizontal ones are not, although it may be that in some languages, a simple triangular vowel system /a i u/ could be modelled with reference to only one axis, |spectral peak|, or even |F2|.

the Northwest Caucasian language Kabardian (e.g. S. R. Anderson 1978). Indeed, the least convincing aspect of the vowelless analysis of that language in Kuipers (1960: 50-1), is the argument that /a/ represents a "feature of openness".

As well as its ubiquity, mention must be made of the tendency of /a/ to invariance in a number of languages. In many of the languages surveyed above, a wide range of phonetic vowel values was reported, often equal or superior to those which appear in languages without minimal vowel systems. However, much as triangular vowel systems, without a phonemic distinction in timbre for the most sonorous vowel, are common cross-linguistically, so too does the allophony of /a/ tend to be restrained in minimal vowel systems.

While the allophony of /ə/ frequently ranges over a large portion of the vowel space in many of the languages surveyed with two distinct vowels, that of /a/ is often much more constrained, with a lesser degree of conditioning by surrounding consonants. This is clear especially in Arandic languages such as Arrernte (Tabain and Breen 2011: 81) and in Ndu languages (Staalsen 1966: 70). However, it can also be seen by comparing the allophones of /a/ and /ə/ in Chinese in 2.2.2, has been reported for the Central Chadic language Gude (Hoskison 1975: 24) and is also apparent in Modern Irish, as discussed in 1.3.2, above.

Also evident in the survey is a general preference for front vowels over back vowels. For a number of the languages in the survey, vowel systems with front and central vowels, but no phonemic back vowels, were put forward. This is the case for those Arandic languages which have innovated phonemic /i/, and may thus be transcribed /a ə i/ or /a e i/.[124] It is also the case for Anindilyakwa, which has the vowel system /a (æ) (ɛ)/ according to Heath (1975) or /a ɛ ə i/ according to Egmond (2012). Wichita has the inventory /a e i/ according to one source (Rood 1976) as well. Furthermore, a Central Chadic language, Bana (E. Hoffmann 1990) has been described as having the vowel system /a e ə/.

These systems are not discussed in the typological literature on vowel systems, but the preference for front over back vowels has oft been remarked on. That the

[124] From eyeballing the vowel charts in Iosad and Ní Chiosáin (2016), one might hypothesise that a similar development could be underway in Modern Irish as well, perhaps what motivates them to state "We observe significant coarticulation but the vowel is phonologically front in items like *cuid* 'piece', *muid* 'we', *coigil* 'spare, save', *boilg* 'bellies', at least in the Connemara data". The Arandic comparandum should be taken into consideration in further research into the vowel systems of Modern Irish varieties

number of distinctions in front vowels equals or is greater to the number of distinctions in back vowels is the twelfth of the vowel system "universals" described in Crothers (1978: 122). Vallée et al. (2002: 152) see this as the "classical trend" rather than a universal. According to Maddieson (1984: 125), /i/ is more common than /u/, appearing in 91.5% versus 83.9% of languages surveyed. The figures for the mid vowels, i.e. /e/ in comparison to /o/, were more equal. Systems with only front vowels are predicted by the computational modelling proposed in de Boer (1999).

It is also clear from the phonetic literature there is a cross-linguistic tendency for low vowels to be longer than short ones, all other things being equal (Lehiste 1970: 18; Lisker 1973: 226f.; Keating 1984: 37-9). This generalisation may have articulatory motivation, in that the jaw position for the articulation of high vowels is similar to that of other consonants, whereas the more open low vowel requires greater distance of the jaw from the roof of the mouth and thus greater movement, which takes time (Lindblom 1967: 2ff.; Lehiste 1970: 19; Catford 1977: 197). However, Solé and Ohala (2010: 614ff.) question this assumption and indicate that while the correlation of vowel height and duration does show evidence of being a mechanical effect, it may also be manipulated in some languages by speakers in order to enhance spectral contrast.

Similar remarks can be made about intrinsic pitch, or |f0|. The tendency of low vowels to have lower |f0| than high vowels has been recognised for some time. Although Neweklowsky (1975) specifically argues against the articulatory theory of intrinsic vowel duration mentioned above, he endorses the notion that |f0| differences are universally correlated to differences in vowel height. Whalen and Levitt (1995: 349ff.) compare data from a large number of languages, from a variety of different families, and conclude that intrinsic |f0| correlated to vowel height bears all the hallmarks of a cross-linguistic universal. They dispute the argument of Diehl and Kluender (1989: 126) that this correlation is a deliberate strategy of speakers to enhance perceptual salience for listeners and instead search for an explanation in terms of articulation (Whalen and Levitt: 362f.).

The tendency of low vowels to be longer has created difficulties for phonologists in their analyses of a number of the vowel systems in the survey. Often alternative vowel systems are put forward, with some scholars arguing that there is a durational distinction two vowels transcribed /a: a/, and others claiming that the two vowels differ primarily in height and should be transcribed /a ə/. For the Northwest Caucasian

language Kabardian, Jakovlev (1923) posited the former system, while Trubetzkoy (1925, 1939) argued in favour of the latter. Breen (1977) claimed a durational distinction between the two vowels of the Arandic language Antekerrepenh but then changed his mind and instead posits a height distinction for the same language in 2001. For the Ndu languages, Laycock (1991) has the former system, while Staalsen (1966) has the latter. Indeed, the proposal above regarding the reinterpretation of Comrie's (1991) analysis of the Haruai vowel system is effectively suggesting a durational distinction for that language too, rather than one of height.[125]

Many scholars have proposed that the patterning of terms in a vowel system follows a principle of "maximal dispersion" within the available acoustic space (Liljencrants and Lindblom 1972; Crothers 1978: 125ff.; Lindblom and Engstrand 1989).[126] Flemming (2004: 236f.) claims that the dispersion principle predicts vertical vowel systems and that there are no /a e i/ or /a o u/ systems,[127] as in vowel systems in which |F2| is rendered irrelevant, the principle of minimal effort applies. However, Hall asks if the principle of maximum dispersion does not predict a vowel system /ɒ ə i/, which would make good sense from a dispersion perspective.[128] He argues that such a system does not exist because it is identical to either /a ə ɨ/, /a i o/ or /a i u/ in terms of its contrasts, all vowel systems which are indeed attested (Hall 2009: 23ff.).

[125] More broadly, while the vertical vowel systems with two members discussed above were uniformly transcribed with the symbols /a ə/, future work in this field might consider attempting to differentiate systems with generally lower allophones, for which the transcription /a ə/ is justified, from those with generally higher allophones, for which the transcription /ɐ ɨ/ might be more principled.

[126] In many respects, vertical vowel systems constitute a challenge to such models, as shown below. One reason for this is that models of this sort tend to view the vowel system as a relatively closed system, opposed to an equally closed consonant system. In vertical vowel systems there is often considerable allophony in phonetic vowel realisation, conditioned by surrounding consonants. It is not necessarily the case that vertical vowel systems are not making maximum use of the acoustic space available, just that the use they do make of it cannot be adequately modelled without taking the larger prosodic domain into consideration. Phonological models such as those of the London and Moscow schools, discussed in 3.2.2, below, deal much better with vertical vowel systems.

[127] This statement is largely confirmed by the survery of minimal vowel systems conducted in 2.2, above, although the vowel system /a e i/ has been claimed for Wichita, as discussed in 2.2.5, and some Arandic vowel systems, explored in 2.2.4 come close to this system too.

[128] This indeed follows from geometric conception of the vowel space. If viewed as a triangle with /a i u/ as vertices, the length of the altitude containing the point /a/ is shorter than the distance between /a/ and either /i/ or /u/. In this view, a vowel system /a i/ could be seen as more dispersed than /a ɨ/. If the vowel space is viewed as a some manner of quadrilateral, the same principle is still likely to apply: /ɑ/ and /i/ are certain to be more dispersed than /a/ and /ə/. This shows some of the limitations of viewing vowel systems strictly in a two-dimensional space, and of referring to to vowel systems without reference to consonants.

Embedding dispersion within a theory of phonological contrast makes it possible to abstract away from the specific symbols which are used, given the preference of phonologists for idealised symbols, such as /a i u/, rather than those which accurately reflect phonetic reality. On the other hand, Hall himself notes that the Successive Division Algorithim (SDA) used in contrastive phonology (see Dresher 2009), also predicts unattested vowel systems with more low than high vowels (Hall 2009: 31ff.), such as a hypothetical system /ɒ æ ɨ/.[129]

Having discussed the various distributional questions with respect to minimal vowel systems in the vowel space in this subsection, the next subsection focuses rather on the vowel space itself.

2.3.1.2. The size of the vowel space

Regardless of these strong tendencies in the distribution of terms within the vowel space, there is good evidence that the vowel space itself is not universal, but is rather a language-specific variable. Butcher (1994) comments that in many languages of Australia, although the members of the vowel system are dispersed within the acoustic space in use, this acoustic space is considerably smaller than that used in many other languages. Put otherwise, these languages do conform to a principle of dispersion, but the space in which these vowels are dispersed is not maximal.

Similar trends can be seen for some, if not all, of the languages in the survey above. While the |F1| values of Kabardian vowels given by Choi (1991: 7) are quite unremarkable from a cross-linguistic perspective, the |F2| values are particularly low, around 1600Hz for the vowels transcribed [i e] (cf Wood 1994: 248). Compare this to mean |F2| values of 1900-2150Hz for the vowel [i] in eight distinct languages discussed in Gendrot et al. (2008) and Vaissière (2011: 57). This suggests that also speakers of Kabardian are not making use of the entirity of the available vowel space. On the basis of the observations of Redden (1965: 18f.) it is possible that there may also be a contracted vowel space in the Upland Yuman language Walapai, discussed in 2.2.5.

[129] Barring the single vowel systems, with one low vowel and no high vowels, no such systems were uncovered in this survey either, although some of the descriptions of Anindilyakwa in 3.1.1.3.2 come close.

Indeed, this might also be the case for other languages. Al-Tamimi and Ferragne (2005) report that the size of the vowel space in Morroccan Arabic is considerably smaller than that in Jordanian Arabic or in French, the other two languages in their experiment, relating this to the smaller vowel inventory in the former language. Butcher (1984: 32f.) points out that although the cross-linguistically prototypical three-vowel system tends to be reported as /a i u/, in fact only 5 of the 28 languages of the UPSID database used in Maddieson (1984) actually have the vowels [i] and [u]. The others typically have lower and/or more centralised vowel qualities, which still give the impression of a triangular system, but call into question the theory of maximal dispersion in vowel systems. A similar point is made by Boersma (1998: 216), who also relates the size of a vowel inventory to the size of the acoustic space.

There is however, counter-evidence to the claim that a smaller vowel inventory necessarily implies a smaller vowel space. Some of the data in Butcher's (1984) report on the small vowel space of languages of Australia also comes from five-vowel languages, and there are some indications that the smaller vowel space might be a substratum feature of Australian Aboriginal English (Butcher and V. Anderson 2008), which has a considerably greater number of contrastive vowels.[130]

In a study of English, French and Spanish speakers, Meunier et al. (2003: 348) found that the size of the acoustic space used by speakers of the three languages was quite similar, even though Spanish contrasts only five vowels, while in English and French at least twice that number of vowel terms are contrastive. Further surveys using data for multiple languages were inconclusive (Engstrand and Krull 1991) or tended to challenge the notion that there might be a correlation between the size of a vowel inventory and the size of the acoustic space (Livijn 2000).

Another line of inquiry concerns the nature of the consonant systems of the languages in the survey. Northwest Caucasian languages have strikingly large consonant inventories, at the upper end of those attested across the languages of the world. Liljencrants and Lindblom (1972: 857) suggest that there could be a correlation between these rich consonant systems and the reduced number of phonemic vowels. While languages of Australia do not have consonant systems of the size of those attested in Northwest Caucasian languages, like them, they contrast a large number of

[130] See Fletcher and Butcher (2002) and Fletcher et al. (2007) for evidence from further five-vowel languages of Australia.

different localisations. Furthermore, they do not exhibit cross-linguistically common patterns of assimilation, leading Butcher (2012: 139ff.) to suggest that there is a "place of articulation" imperative at work, constraining assimilation in order to maximise perceptual cues for the functionally important localisation contrasts.

Some of the other languages in the survey have extensive systems of secondary localisation, or colour, which are critically important in their consonant systems.[131] This is true of Northwest Caucasian languages, but also of Marshallese and Chadic languages, and, under many interpretations, of Chinese as well,[132] and Irish also falls into this group. In these cases there is extensive vowel allophony, which, in the lack of evidence to the contrary, must be assumed to extend over a normal-sized vowel space. Indeed, researchers into these languages frequently point out the degree of allophonic variation to be found. The question of consonant colour as it relates to Old Irish is discussed in chapter 3, below, but first it is necessary to discuss the various problems of incommensurability raised by the survey.

2.3.2. Problems of incommensurability

In this subsection, a number of theoretical issues of relevance to minimal vowel systems are discussed under the rubric of incommensurability. These fall into two main types: issues regarding the incommensurability of abstract symbols; and issues concerning the incommensurability of phonological descriptions tout court. The discussion below ex-

[131] Not discussed in the survey, but worthy of attention in future research on this topic are systems which can be considered the inverse of those discussed here. This would include languages in which there is a vowel system /a i u/, which can be modelled solely with reference to |F2|, and where |F1| is relevant rather to consonants, or to a larger prosodic domain. One possible point of departure is Arabic, in which *emphasis* has been described as a prosodic or supersegmental feature (Harrell 1960: 26-30; Khalafallah 1969: 21ff.; Ferguson 1978: 164; Younes 1993; Al-Rashdan 2008: 33f.; cf. also Dell and Elmedlaoui 2002: 58-65) with emphatic, consonants having a "hollow" resonance compared to "sharper" plain consonants (Holes 2004: 57). Emphatic consonants in Arabic typically have a lower |F2| (Zawaydeh 1999; Card 1983), and a higher |F1| and |F3| (Jongman et. al. 2007: 915). If |F2| were considered sufficient to model the typical /a i u/ vowel system of many varieties, one could see |F1| as rather being a property of consonants or a larger phonological domain. On the other hand, Jongman et al. (2007: 914f.) argue that spectral mean is a reliable acoustic correlate for emphasis, this being consistently lower in emphatics. Combining this with reports that some varieties of Arabic collapse /i/ and /u/ to /ə/ (Watson 2002: 21; Bellem 2007), some Arabic dialects might actually have minimal vowel systems in the sense understood in this chapter. The topic clearly requires further research.

[132] Zee and Lee (2007) see the vocalism of Chinese dialects to conform well to the predictions fo the maximum dispersion principle.

amines the problem with reference first to symbols, in 2.3.2.1, and then to descriptions, in 2.3.2.2. Subsection 2.3.2.3 illustrates the problem of the incommensurability by, jocularly, asking if Turkish is a Central Chadic vowel prosody language, while 2.3.2.4 discusses melodic domains in phonology, and their relevance to the phonological description of Irish, among other languages.

2.3.2.1. The incommensurability of symbols

When comparative and typological studies of vowel systems list the terms of a given vowel inventory, it is not always clear what is being described. This is especially true of works which rely on large databases of phonological inventories, such as the UPSID database which provided the dataset for Maddieson's *Sound Patterns in Language* (1984), a source which is frequently cited in discussions of phonological typology.

There are a number of problems with databses such as UPSID. Firstly, the data contained therein is not always accurate; Vaux and Samuels (2005: 400) point out a number of cases in which aspirated stops were described as unaspirated in Maddieson (1984). Secondly, databases such as UPSID tend to reify the segment, especially if it is familiar or common cross-linguistically, meaning that important generalisations are missed.

In the case of Modern Irish, the sonorants are presented as being either plain or velarised or palatalised; the labial stops as being either labiovelarised or palatalised, i.e. /p^{hw} p^{hj} b^{w} b^{j}/; the velar stops as being either plain or palatalised, i.e. /k^{h} k^{hj} g g^{j}/; and the coronal stops as not having any secondary localisation, i.e. /$t̪^{h}$ $d̪$ t^{h} d ʧ ʤ/. The choice of symbols completely obscures the central fact of the language's phonology, namely that in the consonant system there is a pervasive contrast between two colours, traditionally termed broad and slender.

The UPSID "phoneme" is in fact an allophone of a phoneme, and as Ladd (2009) is surely correct in suggesting that phonologists prefer idealised symbols, it is likely to be that symbol which is most readily comparable to symbols used for the phonemes of other languages. In a paper dealing with the difficulties involved in using the UPSID database, Simpson (1999: 350) remarks as follows on the phoneme therein: "the allophone no longer represents the phoneme, it replaces it; the phoneme and its

characteristic allophone become one and the same thing. This reduces the phonemic system of a language to a small, arbitrary selection of its phonetics".

The confusion between the phoneme and its allophone criticised here is not uncommon in discussions of minimal and vertical vowel systems. De Boer (1999: 49) uses square phonetic brackets for the vowels of Kabardian, but the Kabardian vowels each have a wide range allophones, of which central ones need not be the most common. In Boersma and Hamann (2008: 219) there is chart with a selection of contrasting phonemes from different languages illustrating observed auditory dispersion. In the chart, these phonemes are presented between slanted brackets, but in the following text, square brackets for the same phonemes appear instead, and the range of allophonic variation of the non-contrasting phonemes is not discussed.

While databases such as UPSID do rely on "phonemic" inventories, as constituted they are incapable of integrating the basic relational insight of the Prague school that phonemes cannot be defined as autonomous enities, but by what distinguishes them from other phonemes within the system.[133] As the structuralists might have it, *tout se tient*. The Modern Irish phoneme /tʹ/, transcribed in UPSID as /tʃ/, and indeed realised [tʃ] in some dialects, is in no way identical to the phoneme which can be transcribed that way in say Spanish (Baker 2004: 35), or Kuteb (Koops 2009: 34), or Mongsen Ao (Coupe 2007: 28). The phoneme of one language is not commensurable to the phoneme of another.

In a similar fashion, it was shown in 1.3.2, above, that many varieties of Modern Irish are commonly analysed as a vertical short vowel system with three members, transcribed here /a ə ɨ/. However, this does not mean that [ɨ] is a frequent allophone of any phoneme.[134] The choice of the IPA symbols for central vowels in vertical vowel systems is a transcriptional convenience, not a comment on phonetic realisation, as this vowel /ɨ/ is most often realised as either [ɪ] or [ʊ] in Modern Irish.

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[133] Maddieson's (1984: 160) contrasts his own position that phonemes should be defined in terms of phonetic attributes with one which holds that phonology is concerned with purely abstract constructs. However, the concept of the phoneme developed by the Prague school does not go to such an extreme. A belief in abstraction does not preclude the exploration of universals either, as he goes on to suggest. In fact, one might observe that a predisposition to abstraction is itself a universal of human thought

[134] This is the reason for which Hale (2000) and Hale and Reiss (2008) use a cup of coffee, a telephone, yin-yang and a soccer ball for the terms of the Marshallese vowel system. The use of the same set of symbols in both phonemic and phonetic transcription is not in itself objectionable, once care is taken not to confuse the two levels of analysis.

Similarly, Trubetzkoy (1939: 141) claims that Tamil has five obstruent phonemes. These surface as aspirated stops, [pʰ tʰ ʈʰ ʧʰ kʰ] initially; as spirants, [β ð ð̠s x] medially; as voiced stops, [b d ɖ ʤ g], after nasals; and as voiceless unaspirated stops, [p t ʈ ʧ k], after /r/. The most straightforward phonemic transcription of these five obstruents is as /p t ʈ ʧ k/, but this is not to suggest that [p t ʈ ʧ k] are in any way the most common or typical allophones of these phonemes.

The lesson to be learned from all this is that phonological typology cannot proceed by comparing *symbols*, but must rather compare *systems*. Nothing meaningful can be learned by stating that two languages have a phoneme transcribed /i/. The /i/ of one language might occur very frequently, have an unrestricted distribution, and possess allophones ranging over a large proportion of the vowel space. The /i/ of a second language might be uncommon and highly restricted in terms of its distribution and allophonic range. These individual phonemes only make sense when viewed as terms embedded in a system, not as autonomous entities possessed of some transcendental identity.

There are, however, things that can be compared in phonology. One can compare the size of the vowel space in two languages, for example, as discussed in 2.3.1.2, above, or the phonetic range of consonant realisations which occur. One can talk about the number of different terms in a given phonological subsystem, as was done throughout 2.2, and compare patterns of contrast, as well as the articulatory and acoustic correlates of given contrasts, and the saliency of acoustic cues in their identification, as carried out for Old Irish in 3.2, below. There are a wide range of comparative concepts (Haspelmath 2010) available to the typologically orientated phonologist that do not require reification of alphabetic symbols or recourse to categorical universalism.

Adopting a position of categorical particularism in the tradition of Boas (1911) necessarily draws attention away from the ontological status of linguistic categories themselves and on to the ways in which language using subjects[135] form and identify such categories. In this view, the categories employed by both linguist and language using subject are *ad hoc* in the Firthian sense (pace Waterson 1987), in that their substantive content has no universal validity. However, the processes and modality of

[135] In the sense of Fraser (1996).

categorisation are indeed likely to be universal, deriving as they do from common properties of human embodiment and cognition.[136] This point is returned to in 3.2.1, below, where the phonological model used in this work is laid out.

2.3.2.2. The incommensurability of systems

There is another dimension to the problem of incommensurability, which also relates to the comparison of terms in phonological systems. This problem concerns the ontological status of consonants and vowels. Manaster Ramer and Bicknell (1995: 150) quote Hoenigswald (1960: 137), who asks "the term vowel is not well defined: is a language which has syllabic (nuclear) allophones for certain of its phonemes, as Indo-European does for /y, w.../ typologically a 'one-vowel' language?". Of the languages in the survey, this point is particularly relevant to Nuxálk, examined in 2.2.5.

There is nothing at all odd about a language with the vowel system /i a u/, with a CVCV syllable structure, and with distinct semivowels /j w/, the authors argue, but if these features are combined, then the vowels /i u/ and the semivowels /j w/ will always be in complementary distribution, and the difference between them cannot be considered phonemic. That being the case, it makes no difference in most versions of phoneme theory, whether one writes /j/ and /w/, or /i/ and /u/, but it is inconsistent to do both.

The point is well-taken, and points to a fundamental difficulty in phonemic analysis that does not present a straightforward solution. Manaster Ramer and Bicknell (1995: 154f.) conclude that "we would [...] insist that, before comparing different languages, we make sure that we are using commensurate descriptions". This point is of direct relevance to the survey of minimal vowel systems undertaken in 2.2, above, and

[136] Linguistic categorisation is dealt with in detail by Taylor (1989). However, his view of phonology fundamentally differs from that put forward here, subscribing as he does to the common position in Cognitive Linguistics (Jaeger 1980; Nathan 1996) that the phoneme is a basic-level category (see Lakoff 1987). Arguments for this (e.g. Nathan 2007) are often based on the bizarre claim that alphabets are somehow superior to or more basic than other writing systems, a claim that Baroni (2011) correctly dismisses as an ethnocentric prejudice based on eurocentric bias. I have argued against the view of the phoneme as having basic-level status (C. Anderson 2015b), and am sympathetic to the opinion of Firth (1948) that the phoneme is a "phonetic hypostatization of roman letters" (see also Port and Leary 2005; Port 2010a, b; pace Fowler 2010).

is illustrated below by way of a comparison of descriptions of Central Chadic languages, discussed in 2.2.7, above, and Turkish.

If the features for vowel quality and the features for consonant colour, both of which rely primarily on percepts indexed primarily to |F2|, are unified under the rubric of *melody*, it is possible to establish a typology of melodic domains. In the first place, in many, even most languages, melody appears to be a property principally of vowels. There is, however, the possibility of gradience within these systems, with the onset of the vowel at the CV interface being parametrised as a property of the consonant or of the vowel, as G. Schwartz (2016) has demonstrated for English and Polish respectively.

Secondly, in some languages melody is generally considered to be primarily a property of consonants. These languages typically have contrastive consonant colour, which *fills in* vowel features through assimilation. Examples include Kabardian (Choi 1991), where the assimilation appears to be progressive; Anindilyakwa in the analysis of Leeding (1989), where it is seemingly regressive; and Modern Irish (Ní Chiosáin 1991), Marshallese (Bender 1968), and Gude (Hoskison 1975), where vowel quality depends on the character of both preceding and following consonants.

Finally, there are languages in which melody is usually analysed as being a property of an extended prosodic domain. Two subgroups can be identified here: harmony systems and prosody systems. Languages with harmony systems are most often analysed as having vowel harmony, as in Turkish, although consonant harmony have also been described, for example in Karaim (Stachowski 2009 is a good summary of the relevant literature). Prosody systems are, to my knowledge, nowadays normally described only for Central Chadic languages, discussed in 2.2.7, above. Gravina (2014), which is the most comprehensive work of historical phonology of these languages to date, distinguishes primarily vowel prosody systems and consonant prosody systems, admitting also a mixed type.

Central Chadic vowel prosody systems typically have one or two vowels: /a/, which is invariably underlying, and /ə/, which is often epenthetic. There are palatal and labial prosodies which have a right-to-left directionality, meaning that suffixes are specified for prosodies, which are then considered to spread leftwards in the word. Consonants are also affected by prosodies and there is often some local conditioning of vowel quality on the basis of the primary localisation of surrounding consonants. A good example is Moloko (Bow 1999; Friesen and Mamalis 2004), discussed above.

Consonant prosody systems, according to Gravina (2014), have large surface consonant inventories with palatalisation typically affecting all consonants, and labialisation of all non-coronals. These languages often have three-member vertical vowel systems, with surface vowel quality generally conditioned by the preceding consonant. As in vowel prosody systems, prosodies have morphological function and can be seen as spreading from a suffix, preferentially targeting consonants on the basis of their primary localisation (cf. the Ethiopian Semitic language Chaha in the analysis of Banksira 2000). These languages can be analysed as having distinctive consonant colour, as in Hoskison (1974) for Gude, or with morpheme-level prosodies, as in Gravina (2014).

Central Chadic languages are nearly always analysed as having prosodies which apply across an extended phonological domain. The only exception of which I am aware is Frajzyngier, whose grammar of Gidar (2008) argues for a four-member vowel system and vowel harmony. This analysis is challenged by Schuh (2010), who favours a more *typical* two-vowel interpretation of Gidar phonology, on the grounds that there is assimilation rather than harmony in Central Chadic languages, that there are no strict divisions in the surface vowel system, and that there are no unspecified suffixes.

Central Chadic is the only linguistic family, to my knowledge, in which the predominant contemporary descriptive praxis is founded on basically Firthian principles. This might be historically contingent, an artefact of the intellectual history of the (Central) Chadic linguistics community. If this were the case, it would be necessary to trace this geneaology, as well as to demonstrate that the Central Chadic languages can be satisfactorily reanalysed without recourse to prosodies. Alternatively, it could be that the existing descriptive praxis is the most fitting and parsimonious way to describe these languages. If that is the case, as I believe it to be, then one might ask whether other languages might profitably be described in the same way.

2.3.2.3. Is Turkish a Central Chadic vowel prosody language?

At first blush, Turkish looks like a Central Chadic vowel prosody language. It has one vowel, /a/, while epenthetic /ə/ breaks up illicit consonant clusters (Charette and Göskel

1998; Charette 2006; Hankamer 2011).[137] It has palatal and labial prosodies, the former applying at the level of the word,[138] and the latter at the level of the syllable, meaning that non-initial /a/ is never affected by the labial prosody. The following system of vowel allophony applies, with Y and W representing palatal and labial prosodies, respectively:

Table 13. The vowels of Turkish

Vowel	Y	WY	-	W
∅	i	y	ɯ	u
/a/	e	œ	a	o

There are certain ways in which Turkish is, however, atypical of Central Chadic vowel prosody languages. While the palatal prosody is most often described as affecting velars in Turkish, and other Turkic languages, it primarily affects coronals in Central Chadic languages. More importantly, the directionality of assimilation is left-to-right in Turkish, whereas it is right-to-left in Central Chadic languages. Prosodies in Turkish are thus a (static) property of the root, its vocalism thus being invariable, and morphological extensions assimilating to it. In Central Chadic languages, morphological extensions, i.e. suffixes, are specified for prosodies, and they affect the root.

This assymetry no doubt contributes to the fact that Turkish is typically analysed without prosodies, as having vowel harmony instead. From a purely phonological perspective, however, the most substantial difference between Turkish and Central Chadic vowel prosody languages is the directionality of assimilation.

This reanalysis of Turkish as a vowel prosody language is far from original. In the orthography of Orkhon Turkish, from the 8th century CE (Tekin 1969; Rona-Tas 1998) there are distinct graphemes for front and back consonant pairs and four rather than eight graphemes to represent the vowels, effectively analysing the palatal prosody as a feature of consonants rather than vowels.

[137] These descriptions do not present a one-vowel analysis, but they do claim that the high vowels of Turkish can be analysed as epenthetic.
[138] In loanwords, the final consonant of the root takes palatal prosody and suffixes harmonise to this (Waterson 1956).

2.3.2.4. Melodic domains in phonology

Jakovlev (1928) termed the agreement of melody features in both consonants and vowels across a word as "synharmonism". This term has been used also for the situation in Neo-Aramaic languages, e.g. Younansardaroud (2001).[139] In Reformatsky (1966), the eight vowels typically described for Turkic languages are reduced to two, the front-back contrast and rounding being abstracted from the vowel to the larger phonological domain of the word: "the suprasegmental factor of palatal/velar synharmonism". He gives the examples *qam* 'care' /ˣkam/ [qam] and *kem* 'want of something' /ʸkam/ [kęm] from Kyrgyz to illustrate this.[140] This analysis is very much in the same spirit of that of Waterson (1956) for Turkish.

This points to a convergence in the analytical practice of the Moscow and London schools of phonology, through which a feature, which applies across a certain domain is abstracted away from that domain.[141] Not only does this lead to a parsimonious statement, but being declarative it largely obviates the need for spreading mechanisms of the sort employed in autosegmental approaches, and can potentially deal very well with opacity. However, the Firthians tended to apply the principle of front and back prosodies to practically every language they analysed, for example in Carnochan, Henderson and Whitley's work on French (Ogden and Kelly 2003).[142] Simpson (2005) even speculates that Whitley considered it a linguistic universal.

While there could be good arguments for this in terms of analytical parsimony, from a typological perspective it is desirable to be able to differentiate between languages such as French, in which melody is primarily a vocalic property, and languages such as Kabardian, in which it extends across a domain equivalent to the syllable. One of the few attempts to model this difference representationally is Carvalho (2005), who explictly compares French and Kabardian, arguing that melody elements are linked

[139] According to Younansardaroud, in the Neo-Aramaic variety of Särdä:rïd consonantal emphasis extends throughout the entire word (Younansardaroud 2001:20).
[140] Under other analyses of the modern Turkic languages the syllable can be considered the domain of synharmonism (e.g. Johanson 1998: 31), i.e. syllabic synharmonism obtains. The notion of syllabic synharmonism was introduced by Jakobson (1929: 11-12), who believed that the hard or soft (i.e. palatal or non-palatal) colour of late Proto-Slavic vowels and consonants was a shared property of the syllable rather than of either the vowel or the consonant alone.
[141] Similar in conception are the "long" segments of Z. Harris (1944: 182ff.), which extend over more than one segment.
[142] Also worthy of mention in this context is Petrovici's (1956) analysis of Romanian.

solely to vowel positions in the former, but doubly linked to to both consonant and vowel positions in the latter.

While the existence of melody features in the phonological systems of the world's languages indeed appears to be a universal, there is clearly a continuum in terms of the extent of the domain in which they operate. In some languages, these features tend to be proper to a single segment, typically a vowel, while in others they extend over a larger domain, up to and including the word. Importantly for the purposes of this dissertation, Irish appears to occupy an intermediate position, and the most useful analytical comparanda are to be found among other languages similarly do not fall neatly into either of the two endpoles on this continuum. This includes, to an extent, Northwest Caucasian languages, but also Marshallese, Gude in the analysis of Hoskison (1974, 1975), and perhaps also Chinese.

That being the case, the analysis of Old Irish consonant colour and vocalism given below draws explicitly on prior analyses of some of these languages. In particular, the abstract consonants described in 3.2.2.3, below, transcribed /∅/, have much in common with the "zero consonants" identified by Bender (1968) in Marshallese. The analysis of long vowels and diphthongs as clusters of short vowel and abstract consonant in 3.1.3 is parallel to that commonly employed for Northwest Caucasian languages, amongst others, while the analysis of initial and final vowels is analogous to that of Marshallese. The next chapter outlines these and other features of Old Irish phonology in detail, but begins with a description of its orthography.

Chapter 3: Phonology and orthography in Old Irish

3.1. The Orthography of Old Irish

This chapter discusses the orthography and phonology of Old Irish. The description of the phonology is split into two sections. 3.2 examines the static or paradigmatic phonological system of the language, while 3.3 describes the dynamic phonological phenomena which occur in Old Irish. However, the current section concentrates instead on the orthography of the language.

Old Irish was almost exclusively written using the Latin alphabet. The older ogham alphabet, discussed in 1.1.1, was not regularly used to write the language. The adoption and adaption of the Latin alphabet for writing Irish requires some commentary, given that Irish phonology differs in a great number of important respects from that of Latin.

As regards the *adoption* of the alphabet, two distinct orthographic traditions can be identified. In the first, which in all probability directly continues the ogham tradition, medial fortis stops are written with <p t c>, and medial lenis stops with <b d g>. In the second, which derives from the contemporary British pronunciation of Latin, fortis stops are written double <pp tt cc>, while lenis stops are written single <p t c>, the signs <b d g> being reserved for the lenis fricatives. Subsection 3.1.1, dedicated to the orthography of consonants in Old Irish, describes these two systems in more detail.

As regards the *adaption* of the Latin alphabet, it was necessary to elaborate a way of distinguishing graphically between consonants of different colour. As discussed in 1.3.1, consonant colour was a contrastive property in the Old Irish consonant system, and played a critical role in differentiating morphological forms (C. Anderson 2014b). As there was no parallel in Latin for this aspect of Old Irish phonology, there was

obviously no established way of distinguishing colour in its alphabet either. To overcome the deficiencies of the Latin alphabet in this regard, the solution arrived at was to use graphemes which in Latin represent vowel sounds, i.e. <a e i o u>, to distinguish indicate colour in surrounding consonants. When used in this way, these graphemes are often referred to as "glide" vowels (i.a. *GOI* 84-88; Pokorny 1913 §36-41), but in many cases they are likely not to have had much in the way of vocalic pronunciation, and served solely to indicate consonant colour.

It is interesting to contrast this solution to that arrived at in other languages which adapted the Latin alphabet, where different strategies are used in order to make similar distinctions. Among West Slavic languages, Czech uses diacritics, e.g. <č> /ʧ/, <š> /ʃ/, while Polish makes use of both diacritics, e.g. <ć> /ʨ/, <ś> /ɕ/, <ń> /ɲ/ and digraphs formed from graphemes commonly used to represent consonant sounds, e.g. <cz> /ʧ/, <sz> /ʃ/, <rz> /ʒ/. The Finno-Ugric language Hungarian exclusively uses consonant digraphs to make similar distinctions, e.g. <ny> /ɲ/, <ty> /c/, <gy> /ɟ/.

The solution to this problem arrived at in the early Old Irish period of using graphemes typically used for vowels to indicate consonant colour survives to this day in the orthography of Modern Irish and Scottish Gaelic. It is the topic of subsection 3.1.2, which discusses the orthography of consonant colour and vowels in stressed syllables, and of subsection 3.1.3, which covers the orthography of consonant colour and vowels in unstressed syllables.

3.1.1. The orthography of consonants

Irish orthography makes extensive use of eighteen symbols of the Latin alphabet: <a, b, c, d, e, f, g, h, i, l, m, n, o, p, r, s, t, u>. In Old Irish, <x> is also occasionally found, but is quite rare and alternates with <chs>, both having the value /xs/. An example is the verbal noun spelled *foxal* or *fochsal* 'taking away' (*GOI*: §24), e.g. nominative singular *foxol* (Sg216b5), accusative singular *fochsul* (Ml93d5).

Of the other symbols, <h> is common in digraphs after <p t c>, but only occurs on its own word initially, and there without any apparent phonetic value: "it is arbitrarily prefixed to words which would otherwise be very short, such as those consisting of a

single vowel" (*GOI*: §25). The initial /h/ which occurs under the geminate mutation (see 3.2.1) is not systematically indicated in Old Irish writing (Quin 1975: 10).

Of the remaining symbols, the use of the 'vowel' graphemes, <a, e, i, o, u>, is discussed further in 3.1.2 and 3.1.3. As stated above, these were important not just for indicating the value of the vowel, but played a key role in indicating consonant colour as well. The twelve remaining graphemes, <b, c, d, f, g, l, m, n, p, r, s, t> were pressed into service to graphically represent the consonant sounds of Old Irish and are the focus of this chapter.

When word initial and not mutated (see 3.3.1), most of these consonantal graphemes have approximately their IPA values, with a number of caveats. In Irish orthography in all periods, <c> is used for IPA /k/, and fortis stops, represented graphically with <p, t, c> are aspirated, while lenis stops, represented with <b, d, g>, are only passively voiced (see 3.2.2, below). Furthermore, <f> represented bilabial /φ/ in the Old Irish period, and indeed up until recently, while initial <n, l, r> stand for fortis /N L R/, rather than lenis /n l r/. This is outlined in the following table, alongside the reading transcription used in this work and a likely typical pronunciation.

Table 14. Orthography of consonants in initial (unmutated) position in Old Irish

Orthography	*p*	*t*	*c*	*b*	*d*	*g*	*m*	*f*	*s*	*n*	*l*	*r*
Reading transcription	/p/	/t/	/k/	/b/	/d/	/g/	/m/	/φ/	/s/	/N/	/L/	/R/
Likely pronunciation	[p^h]	[$t̪^h$]	[k^h]	[b]	[$d̪$]	[g]	[m]	[φ]	[s]	[$n̪$]	[$l̪$]	[$r̪$]

Under mutation, discussed in detail in 3.3.1, a further consonants can occur in initial position. Under one type of mutation, lenition, stops are typically transformed to spirants. For the fortis spirants, /φ θ x/, i.e. the lenited forms of /p t k/, the digraphs <ph, th, ch> are used, on the Latin model (Harvey 1990: 188). For the lenis spirants, /β ð ɣ/, i.e. the lenited forms of /b d g/, the symbols <b d g> are used. This latter convention creates some ambiguity, in that the same symbols are used for lenis fricatives and lenis stops. A similar ambiguity occurs with the lenition of /m/ and the sonorants, where <m, n, l, r> are used for lenited /µ n l r/, not distinguished in writing from /m N L R/.

For the abstract consonant /∅/, which results from the lenition of /φ/, and for /h/, which is the product of the lenition of /s/, a number of conventions are used. Sometimes, simply <f> and <s> are used also for the lenited variants, while occasionally no consonantal grapheme whatsoever appears, and later the punctum delens came to be placed above the lenited consonant, a practice which in later orthography came to simply indicate lenition of a consonant. Examples of each of these types can be found in C. Anderson (2012). The overall system for the orthography of lenited consonants in Old Irish is laid out in the table below:

Table 15. Orthography of lenited consonants in Old Irish

Orthography	*ph*	*th*	*ch*	*b*	*d*	*g*	*m*	*f~ḟ*	*s~ṡ*	*n*	*l*	*r*
Reading transcription	/φ/	/θ/	/x/	/β/	/ð/	/ɣ/	/µ/	/∅/	/h/	/n/	/l/	/r/
Likely pronunciation	[φ]	[θ]	[x]	[β]	[ð]	[ɣ]	[ṽ]	-	[h]	[n]	[l]	[r]

The orthography of nasalised consonants is in many respects the inverse of that of lenited consonants, in that the nasalisation of fortis /p t k/, as well as /φ/, is not marked graphically, while the nasalisation of lenis /b d g/ is given orthographic representation. The nasalisation of the lenis stops is shown by prefixing <b, d, g> with a nasal, which itself often takes the punctum delens (*GOI*: §33). The nasalisation of vowels is shown by a prefixed <n>, while /m/ and the sonorants are often written double, i.e. <mm, nn, ll, rr>, after a nasalising proclitic (Quin 1975: 9). This is laid out in the table below:

Table 16. Orthography of nasalised consonants in Old Irish

Orthography	*p*	*t*	*c*	*mb*	*nd*	*ng*	*mm*	*f*	*s*	*nn*	*ll*	*rr*
Reading transcription	/b/	/d/	/g/	/m/	/N/	/ŋ/	/m/	/β/	/s/	/N/	/L/	/R/
Likely pronunciation	[b]	[d̪]	[g]	[m]	[n̪]	[ŋ]	[m]	[β]	[s]	[n̪]	[l̪]	[r̪]

As can be seen from the tables above, there is considerable ambiguity in Old Irish orthography, especially with respect to the spelling of stops. In particular, the lenis stops /b d g/ can be represented graphically by either the conventional symbols for these, i.e. <b, d, g>, as in radical position, or with the conventional symbols for the fortis stops, i.e. <p, t, k>, as in the table above.

This has parallel medially, where it seems that there were two separate traditions in Old Irish orthography (Ó Cróinín 2001: 9f.): one older and Irish, which directly continued the orthographic practice of the ogham tradition (McManus 1991: 44), in which /b d g/ were written with <b, d, g>; and one more recent and deriving from the British pronunciation of Latin (Mac Neill 1931: 44ff.), in which /b d g/ were written with <p, t,

c>, except in absolute initial position In the first tradition, the fortis stops were typically written with <p, t, c>, while in the second they are instead written double, <pp, tt, cc>. It is the second tradition which is by far the more common in the Old Irish period.

Table 17. Orthography of selected medial and final consonants in Old Irish

Irish tradition	*p*	*t*	*c*	*b*	*d*	*g*	*b*	*d*	*g*
British tradition	*pp*	*tt*	*cc*	*p*	*t*	*c*	*b*	*d*	*g*
Reading transcription	/p/	/t/	/k/	/b/	/d/	/g/	/β/	/ð/	/ɣ/
Likely pronunciation	[p^{h}]	[t̪^{h}]	[k^{h}]	[b]	[d̪]	[g]	[β]	[ð]	[ɣ]

It should be noted that the lenis stops are also occasionally written double as well, i.e. with <bb, dd, gg> for /b d g/. In clusters, there is some variation, with sometimes <p, t, c>, and sometimes <b, d, g> used for the lenis series, and variation between singular and geminate spellings for the fortis series. Finally, where fortis and lenis sonorants contrast, the fortis series are generally written double, i.e. <nn, ll, rr>, although, as always, exceptions can be found.

Given the variability, it is clear that orthographic variation is key to establishing pronunciation for the Old Irish period, especially in such cases that the dialects of the modern language cannot provide evidence. This subsection has given an overview of the major trends in the orthography of consonants in Old Irish (for fuller details see Ahlqvist 1994), while the next two subsections examine the orthography of colour and vocalism in the language.

3.1.2. The orthography of consonant colour and vowels in stressed syllables

This subsection discusses the orthography of consonant colour and vowels in stressed syllables in Old Irish, primarily drawing examples from the o-stem nominal declension. Subsection 3.1.3, below, examines the orthography of consonant colour and vowels in unstressed syllables.

As discussed in 1.3.1, above, it is necessary from the outset it is necessary to distinguish between the phonology and orthography of consonant colour, which have often been confused in discussions about Old Irish phonology. The phonology of colour involves a featural specification on consonants, as examined further in 3.2.2, below, while the orthography of colour involves how this is represented in spelling. While

phonology is here understood in terms of abstract categories derived from the perception of acoustic events, orthography is rather a graphic representation of linguistic forms. The two must be kept clearly distinct. In this work, the term *infection* is used to describe the phonological principle whereby consonant colour influences vowel timbre, while the term *affection* is used for the orthographic principle whereby vowel graphemes are used to indicate the colour of surrounding consonants.

When dealing with a language which is no longer spoken, phonological analysis relies perforce partially on an interpretation of orthography. In the case of this thesis, the use of vowel graphemes to mark consonant colour is critical. While all researchers would likely agree that the <i> in a word such as *súil* 'eye-nom. sg.' is a vowel of affection, i.e., it serves solely to indicate that the following lateral is a slender /l′/ and not a broad /l/ (pace Ascoli 1891), not all cases are so straightforward.

If three contrasting consonant colours are assumed, then the <u> in *fiur* 'man-dat. sg.' is similarly just a vowel of affection, showing that the following rhotic is u-colour /r°/ and not a-colour /r/ or i-colour /r′/. If, however, only two consonant colours are postulated, then the same <u> must be considered phonologically salient, forming part of the short diphthong /iu/ (pace Jaskuła 2006: 198ff.). Throughout this subsection, repeated comparison will be made between the traditional approach, which assumes three contrastive consonant colours and five short vowels in Old Irish, the binary approach, which holds that the language had two contrastive consonant colours and eight phonemic short vowels or diphthongs, and the ternary approach adopted here, which considers Old Irish to have three contrastive consonant colours, and only two short vowels, /a/ and /ə/ (see 1.3.1).

Surface vowel allophony in stressed syllables is most clearly visible in o-stem nouns, in which the coda consonant varies according to case: a-colour in the nominative singular, i-colour in the genitive singular, and u-colour in the dative singular. For this reason, the data in this section is primarily drawn from this class of nouns.

The orthographic representation of chromatic alternations in the codas of o-stem nouns depends significantly also on the colour of the consonant onset, given the limited range of vocalic graphemes available to those who wrote Old Irish. For this reason, nouns with initial i-colour are dealt with in 3.1.2.1, below, then nouns with initial u-

colour in 3.1.2.2, and finally nouns with initial a-colour in 3.1.2.3. The orthography of stressed vowels in polysyllables is covered in 3.1.2.4.

3.1.2.1. Initial i-colour monosyllables

Two patterns may be observed in monosyllabic o-stem nouns with i-colour in the onset. In the first, <e> in the nominative singular alternates with <i> in the genitive singular and <iu> in the dative singular. An example of such a noun is *fer*[143] 'man'. In the second pattern, <e> in the nominative singular alternates with <ei> in the genitive singular and <eu> in the dative singular. An example of this pattern is *leth* 'half'.

With regard to the first pattern, exemplified by *fer*, the phonemicisations implied by the traditional approach, the binary approach, and the ternary approach, as defined in subsection 1.3.2, are given in the table below.

Table 18. Orthography and phonology of o-stem nouns with /ə/ and i-colour onset, *fer* 'man'

	nom. sg.	gen. sg.	dat. sg.
Orthography	*fer*	*fir*	*fiur*
Traditional	φ′er	φ′ir′	φ′ir°
Binary	φ′er	φ′ir′	φ′iur
Ternary	φ′ər	φ′ər′	φ′ər°

As can be seen from the table above, the ternary approach to consonant colour sees the vowel in this word as being constant, /ə/, with only the coda consonant alternating: a-colour in the nominative singular, i-colour in the genitive singular, and u-colour in the dative singular. The traditional and binary approaches rely on both vowel and consonant alternations, with /e/ in the nominative singular and /i/, or in the case of the binary approach, /i/ and /iu/, in the genitive and dative singular. While the traditional approach was developed before the advent of phonemic thought, it implies an alternation between /e/ and /i/ in the context of three consonant colours. The binary approach, on the other hand, relies on an alternation between /e/, /i/ and /iu/ in the context of two consonant colours.

The table below shows the second pattern of o-stem nouns with an i-colour onset:

[143] The examples chosen in this subsection are largely those given in Jaskuła (2006: 171ff.).

Table 19. Orthography and phonology o-stem nouns with /a/ and i-colour onset, *leth* 'half'

	nom. sg.	gen. sg.	dat. sg.
Orthography	*leth*	*leith*	*leuth*
Traditional	lʹeθ	lʹeθʹ	lʹeθ˚
Binary	lʹeθ	lʹeθʹ	lʹeuθ
Ternary	lʹaθ	lʹaθʹ	lʹaθ˚

Again, in this case, the vowel is constant in the ternary approach, with the same alternations in the colour of the coda consonant as above. The traditional approach also has an invariant vowel, /e/, with alternation only in the colour of the coda consonant. The binary approach has an alternation between the vowels /e/ and /eu/ within the context of a two-way contrast in consonant colour.

In both the traditional approach and the binary approach, the vowel alternations in the patterns above are morphologically conditioned. There is nothing in the phonological representations of these words which determines whether a given o-stem noun exhibits alternations such as those of the first pattern or those of the second. In the ternary approach, on the other hand, the two alternation patterns fall out directly from the phonological representations. Nouns in which the vowel is /ə/ show the vowel alternations of the first pattern, while those in which the vowel is /a/ show the alternations of the second pattern.

One advantage of the ternary approach then, is that it provides a phonological explanation for the vowel alternations in o-stem nouns. The consonantal alternations, on the other hand, are morphologically conditioned regardless of the approach one adopts. However, to argue that only the coda consonant alternates, and not the vowel as well, is to significantly simplify the synchronic description of this nominal class. It also has the happy consequence of eliminating apparent irregularities, as shown below for nouns beginning with a u-colour consonant.

3.1.2.2. Initial u-colour monosyllables

In monosyllables with u-colour in the onset, there are similarly two patterns of vowel alternations. In the first, nominative singular <o> alternates with genitive singular <ui> and dative singular <u>, while in the second, <o> is found in both the nominative and dative singular, while <oi> is found in the genitive singular. The first pattern is

exemplified by *son* ‘sound’, the second by *folt* ‘hair’. The first pattern is shown in the table below:

Table 20. Orthography and phonology of o-stem nouns with /ə/ and u-colour onset, *son* ‘sound’

	nom. sg.	gen. sg.	dat. sg.
Orthography	*son*	*suin*	*sun*
Traditional	son	s˚un′	s˚un˚
Binary	son	sun′	sun
Ternary	s˚ən	s˚ən′	s˚ən˚

Most versions of the traditional account here rely on alternations in the initial consonant, the vowel and the final consonant.[144] The binary account relies on a consonant alternation in the genitive singular and a vowel alternation in both genitive and dative singular. The ternary account, on the other hand, again relies solely on alternations in the final consonant. The second pattern, exemplified by *folt*, is shown below:

Table 21. Orthography and phonology o-stem nouns with /a/ and u-colour onset, *folt* ‘hair’

	nom. sg.	gen. sg.	dat. sg.
Orthography	*folt*	*foilt*	*folt*
Traditional	φolt	φol′t′	φolt
Binary	φolt	φol′t′	φolt
Ternary	φ˚alt	φ˚al′t′	φ˚al˚t˚

In this case, there is no difference between the traditional and binary accounts. Both posit an invariable vowel /o/, with the only difference between the three forms lying in the fact that the final cluster in the genitive singular is slender or i-colour. These facts have been taken as constituting a problem for the traditional account, and indeed any proposal holding that there is a distinctive u-colour in Old Irish: seeing as these nouns do not have a graphic <u>, it is assumed that the final consonant does not have u-colour.

However, in the ternary account, this problem is considered ephemeral. In the same way that /a/ between i-colour consonants, or between an i-colour consonant and an a-colour consonant, is written <ei> or <e>, and presumably surfaced as [e], /a/ between

[144] This is true of both Vendryes (1908) and Thurneysen (1909, 1946) if we take their statements that a-quality is found before *o* as being synchronic valid. However, Thurneysen in particular had a tendency to conflate diachronic and synchronic observations (see Greene 1973: 127). According to Pokorny (1913), consonants are rounded after <o>, leading to greater regularity in this instance.

two u-colour consonants, or between a u-colour consonant and an a-colour consonant, surfaced as [o]. This behaviour of /a/ in a palatal or labial environment is parallelled in many other languages with a minimal vowel system, as numerous examples from chapter 2 can demonstrate.

There is thus not any phonetic difference between the realisation of /a/ in the contexts /C′aC/ and /C′aC′/, where it surfaces as [e]. Similarly, /a/ is realised identically in the contexts /C˚aC˚/ and /C˚aC/, where it surfaces as [o]. However, there is a difference in orthographic practice. Following an i-colour consonant, there is a graphic alternation between <e>, used generally before a-colour consonants, and <ei>, used only before i-colour consonants. After a u-colour consonant, /a/ is written as <o>, irrespective of whether an a-colour or u-colour consonant follows. There is one lone attestation of <ou> in the dative singular of an o-stem noun, i.e. *routh* 'wheel' (Wb11a3), but the practice of marking u-colour in such instances obviously did not find wide currency. There are a number of reasons why this might be the case.

The two most common instances in which final u-quality is the exponent of a morphological category include the dative singular of o-stem nouns and the first person singular of many verbal forms. In the former case, it should be noted that o-stem nouns with /ə/ are far more frequent than those with /a/. This asymmetry, shared by o-stem nouns beginning with an i-colour consonant, means that the number of words in which there is potential contrast is not particularly large.

In the case of the first person singular verbal forms, the vowel is invariably /ə/. In such instances, the orthography allows no room for ambiguity. Indeed, in some instances /ə/ rather than /a/ appears to be part of the exponence of a the /-∅˚/ formative that characterises the person ending of the relevant verbal forms (see 5.1.2.1). The fact that /a/ does not occur in these morphological forms, or does so only very rarely, means that ambiguity is rare. On the other hand, contrast between final a-colour and final i-colour after /a/ is relatively frequent in both the verbal and nominal systems (see C. Anderson 2014b). There is thus greater motivation for disambiguating /a/ before an i-colour consonant than before a u-quality consonant.

It should also be remarked that the consistency of practice with respect to making the orthographic distinction between <e> and <ei> can easily be overstated. In a study of the relative frequency of present indicative deuterotonic verbal forms with the root *·beir*, C. Anderson (2014b: 31) found that only 72 of 128 instances (56%) of such forms in the Milan glosses were spelled with <ei>, the remainder being spelled simply <e>.[145] While Thurneysen (*GOI*: §554) believed that i-colour and a-colour varied in the coda of such forms, this view has not, to my knowledge, met wide acceptance. It is not mentioned in McCone (1987) and is similarly absent from Stifter (2006: 92).

This subsection, and the previous one, have outlined the orthography of consonant colour and stressed vowels in o-stem nouns with initial i-colour and u-colour respectively. The following subsection examines the situation in o-stem nouns with initial a-colour.

3.1.2.3. Initial a-colour monosyllables

While there are also variations in the spelling of monosyllables with an a-colour consonant in the onset, they are of a different nature than those found in o-stem nouns with initial i-colour or u-colour, and the analysis requires a little more explication. Again, two patterns emerge, which can be exemplified by *salm* 'psalm' and *ball* 'member'. In the former, <a> in the nominative and dative singular contrasts with <ai> in the genitive singular. In the latter, while <a> is regular in the nominative singular, both <ai> and <oi> are found in the genitive singular and there is variation between <au> or <u> in the dative singular.

The only published works positing a vertical vowel system for Old Irish (C. Anderson 2014a; 2014b) argue that the first pattern reflects nouns with underlying /a/, while the second reflects nouns with underlying /ə/. However, it is worth examining if the latter pattern might occur only in the environment of a labial, being no more than a phonetic effect, much as has been claimed for unaccented vowels (Stifter 2006: 379).

In the Würzburg glosses there are only four monosyllabic o-stem nouns with initial a-colour and a short vowel with sufficient tokens for a pattern to become evident.

[145] For the form *do·beir* 'gives', there were actually more spellings with <e> than with <ei> (53% of 38 tokens). For the more common *as·beir* 'says', spellings with <ei> were in the majority (60% of 86 tokens). For *ar·beir* 'lives', there were two examples of each spelling.

The nouns *macc* ‘son’ and *rath* ‘grace’ take the first pattern, while *ball* ‘member’ and *daum* ‘ox’ take the second. These provide very weak evidence for the conditioning being a phonetic effect: while it is true that both *ball* and *daum* have labial consonants and take the second pattern, so does *macc*, which takes the first.

In total, there are only twenty-six instances of <au> in the Würzburg glosses, many of which can be disregarded on further examination. The form *paupertas* (Wb16c2) is no more than an unassimilated Latin loan,[146] while *Dauid* (Wb5b5) and *Ambaucu* (Wb19b17) are proper names, the former being modelled directly on the Latin spelling. To this group should probably also be added *auctor* ‘teacher of the law’ (Wb3c4) and *augtortás* ‘authority’ (Wb14b2; Wb9b5), which are both Latin loans and transparently modelled on the Latin spelling.[147]

A number of other cases involve the combination <au> across the boundary of *iairmbéarla* and *focal* (see 1.2.2 for definition of these terms). This sometimes involves a third person singular neuter infix pronoun <a> before a <u> at the beginning of the stressed syllable. Such is the case with *daucci* (Wb13a8) and *daucbaid* (Wb21c12), both forms of *do·uicci*, and with *raucsat* (Wb26b11), the third person plural perfect form of *beirid* ‘carries’. In other instances, the *iairmbéarla* is the past tense of the copula, *ba*, used with forms of *uisse* ‘worthy, just’, such as in the forms *bauisse* (Wb4d20) and *bauissiu* (Wb18c10). These cases can be comfortably discarded, as the *iairmbéarla* and the *focal* constitute separate domains with respect to consonant colour (see 1.2.2, 3.3.3, 4.1.3). The case of *lau* ‘day-dat.’ (Wb29c2), where the two vowels are in hiatus can also be disregarded.[148]

A further group of words, spelled quite inconsistently, includes *aurlam*, spelled with <au> once (Wb8a4), with <ai> twice and with <i> eleven times in Würzburg; and *aurlatu*, spelled with <au> eight times and <ai> twice. Also showing variation are the forms *auccu* ‘selection’ (Wb32b6), which is attested also as *uccu* (Wb30d23); *laigu* (Wb6b12), the comparative of *bec(c)* ‘small’, which is attested also as *lugu* (Wb16c26);

[146] The context confirms this, seeing as it is followed by *semplicitas* in the same phrase: *apaupertas som etasemplicitas* ‘their *paupertas* and their *semplicitas’*.
[147] Thurneysen (*GOI*: §69) lists *auctor* with a long vowel <áu>, but in its historical development it mirrors the other words with short <au> explored in this section.
[148] A number of alternative spellings are also attested here. The question of vowels in hiatus is dealt with in 3.2.3.4, below.

and *rolaumur* (Wb17a8), the first person singular present indicative of *ro·laimethar* ‘dares, ventures’, which is attested also as *rolaimur* (Wb17c21).[149]

As the examples *aurlam* and *aurlatu* suggest, this variation in spelling is common in words which include the preposition *air* ‘before, for’. This was already noted by Thurneysen (*GOI*: §823), who suggested it reflected a vowel, which he transcribes /ö/, for which Old Irish had no unambiguous spelling (*GOI*: §80c). This position is rejected by Greene (1976: 41), who considers it mere phonetic variation in the pronunciation of this preposition, but it seems to find some support in Ó Maolalaigh’s thorough treatment of the issue (2003: 163ff.). The fact that the same variation occurs in words not built on *air* suggests that this variation might indeed more than phonetic.

In the absence of clear evidence for local conditioning governing the synchronic presence of <au> or <u> before a u-colour coda in words beginning with an a-colour consonant, the best solution seems to be to consider these as containing /ə/, as put forward in C. Anderson (2014a; 2014b). While the occurrence of /ə/ after an a-colour consonant seems to be rare, it renders the system symmetrical, in that both /a/ and /ə/ can follow consonants of all three colours. Furthermore, it is consistent with the phonetic variation outlined in contemporary Goidelic dialects by Ó Maolalaigh (2003), where the reflexes of this rare constellation, i.e. /CəC°/, range across practically the entire short vowel space, but are generally high or sometimes mid, and more often back than front.

This pattern of initial a-colour consonant followed by /ə/, exemplified by *ball* ‘member’, is shown below. Here, following the ternary approach, it is to be presumed that the chromatic transition (see 3.1.2.5) from a-colour to u-colour in the dative singular occurred relatively early in the vocalic portion of the word, as one might expect for /ə/, which shows greater allophony than /a/ in many languages with a minimal vowel system (see 2.3.1.1). The result was a probably diphthongal vocoid, perhaps [ɐʊ], [ɘʊ], [ɵ], or similar, for which there was no unambiguous grapheme available in the Latin alphabet. For this reason, <au> or <u> were variably pressed into service to represent it. The genitive singular is similar, where <oi>, or more rarely <ai> are used to represent a

[149] While *rolaumur* could feasibly be explained as local conditioning by the labial, this is hardly the case for *laugi* or *auccu*.

vowel which was felt to be somewhat different to /a/ in the same environment, perhaps having the value [ɐi] or [ə] (see also 3.2.3.1, below).

Table 22. Orthography and phonology of o-stem nouns with /ə/ and a-colour onset, *ball* 'member'

Orthography	nom. sg. *ball*	gen. sg. *boill, baill*	dat. sg. *baull, bull*
Traditional	baL	baL′~boL′	baL˚~b˚uL˚
Binary	baL	baL′~boL′	bauL~buL
Ternary	bəL	bəL′	bəL˚

The other pattern, with /a/, is exemplified by *salm* 'psalm'. Here, it is to be supposed that the chromatic transition between a-colour and u-colour in the dative singular came late in the vowel, as might be suspected given the relative stability of low vowels in both Old Irish and in other languages with minimal vowel systems (see chapter 2). In this case, <a> was thought to be sufficient to represent the vowel sound and the burden of distinguishing u-colour fell primarily on the coda consonant.

Table 23. Orthography and phonology of o-stem nouns with /a/ and a-colour onset, *salm* 'psalm'

Orthography	nom. sg. *salm*	gen. sg. *sailm*	dat. sg. *salm*
Traditional	salm	sal′m′	salm
Binary	salm	sal′m′	salm
Ternary	salm	sal′m′	sal˚m˚

The above subsections have discussed, in some detail, the orthography of consonant colour and vowels in stressed monosyllables. The following subsection examines vowel affection as an orthographic principle by looking primarily at the orthography of short vowels and consonant colour in polysyllables.

3.1.2.4. Vowel affection as an orthographic principle

Phonologically, stressed vowels in polysyllables behave just as stressed vowels in monosyllables, but the orthographic practice in Old Irish differed between the two. In monosyllables, vowel digraphs are frequently used to show the colour of both onset and coda. However, in polysyllables, the vowel grapheme following the coda frequently gives information about the colour of that consonant.

For example, the dative singular of the o-stem noun *fer* 'man' is *fiur*, as shown above. Here, the vowel is /ə/ and the digraph <iu> clearly shows that the onset consonant has i-colour and the coda consonant has u-colour. However, the accusative plural form in Old Irish is most often spelled *firu*, not *fiuru*, although the latter can also be found occasionally. The reason for this is that with the spelling *firu*, the colour of each consonant is unambiguous: the i-colour of the <f>, i.e. /φ′/, is indicated by the following <i>, while the u-colour of the <r>, i.e. /r°/, is indicated by the following <u>. The orthographic vowel of affection, <u>, as found in a spelling such as *fiuru*, is redundant (pace Greene 1976: 29).

If one adopts the binary approach, where short diphthongs such as /iu/ are considered phonemes, it is necessary to give a diachronic explanation for the presence of this diphthong in forms such as *fiur*, but its only variable presence in forms such as *firu*. In McCone (1996: 114) this explanation is that short **u*, but not long **ū*, caused vowel infection over the intervening consonant. The ternary approach obviates the need for any diachronic explanation for the difference between these forms, as it is considered to be nothing more than the operation of an orthographic principle, termed *affection*, for denoting consonant colour, rather than the existence of any difference in vocalism.

To an extent, the same principle applies to other vowels of affection that one finds in monosyllabes. It is not uncommon to find the vowel of affection omitted when the second vowel makes the colour of the preceding consonant clear. The ā-stem noun *croch* appears five times in the Würzburg glosses in the accusative or dative singular, always as *croich*. However, the lone genitive singular form is *cruche*. The <i> in *croich* is essential to differentiate it from nominative singular *croch*, but in *cruche*, the <e> already shows that the preceding <ch> has i-colour. A digraph <ui>, in which <i> can be considered a vowel of affection, is not uncommon, but its use is facultative, whereas the <oi> in *croich* is systematic.

C. Anderson (2009) conducted a survey of vowel digraphs in the Würzburg and Milan glosses and found a great deal of variation. For example, in the Würzburg there are three cases of the perfect third person plural of *creitid* 'believe' being spelled *rochreitset*, and two cases where it is spelled *rochretset*. In Milan, there are three instances of the spelling *rochreitset* and six of *rochretset*. In all, it seems the Old Irish orthography allows either <e> or <ei> for the vowel /a/ between i-colour consonants,

but with a clear preference for the spelling <ei> in monosyllables, at least in the Würzburg glosses. There is less data for orthographic variation between <oi> and <o> or <ui> and <u>, but it appears in these cases that there is much variation in polysyllables, but that vowels of affection are more rarely omitted in monosyllables.

For example, the adjective *maith* 'good' is, almost without exception, spelled with the digraph <ai> in the nominative accusative singular. The Würzburg glosses have 36 instances of this word with <ai> and one with <i> (Kavanagh 2001: 647). In this case, the vowel of affection, i.e. <i>, is necessary to indicate the colour of the following consonant. However, in the nominative plural form *ma(i)thi*, the spelling varies between <ai> (five times) and <a> (three times) in the Würzburg glosses. In the nominative plural, the <i> of the second syllable already clearly indicates the colour of the <th>, rendering the use of <i> after <a> in the first syllable redundant, and hence faculative in Old Irish orthography.

The above subsections have outlined the ordinary situation with respect to the orthography of stressed vowels in Old Irish. However, there are a number of exceptions to the general principles outlined. These exceptions are examined in the next subsection.

3.1.2.5. Chromatic transitions

A small but significant class of words appear at first glance to disobey the orthographic principles outlined above. In these words, <i>, not <iu>, is found between an i-colour consonant and a u-colour consonant. This is most notable in forms of the definite article, i.e. *in* etc., and in the copula *is*, but can also be seen in the nominal system, where <i> tends to be in free variation with <iu>. Examples from the u-stem nominal declension include *fis~fius* 'knowledge', *bir~biur* 'spit', *gin~giun* 'mouth', *rith~riuth* 'running', while an example of such a dental stem noun is *cin* 'fault' (*GOI*§323). A similar phenomenon can be observed in certain verbal forms, such as the first person singular of the s-subjunctive (see 6.1.1).

A common feature of all these nouns, as well as the verbal forms which display this phenomenon, is that they have a coronal coda. Examples in which the coda consonant is not coronal are absolutely exceptional, such as the spelling *gigrann* 'wild goose' in the St. Gall glosses (Sg36a5), alternating in the same corpus with *giugran* (Sg64b1), showing the expected spelling. The significance of this limitation in the

distribution of <i> to before coronal, and not labial or velar, u-colour consonants, is that it closely echoes patterns of allophony in Modern Irish dialects.

In the Irish of Cois Fhairrge (de Bhaldraithe 1945) there is variation between [i] and [u] in the environment /C′_C/, that is between a slender and a broad consonant.[150] The distribution of these two allophones is essentially the same as that of the spellings <i~iu> and <iu> in the Old Irish glosses, in that [i] is found before coronals and [u] before non-coronals (Ó Maolalaigh 1997: 102).

To explain this distribution, it is necessary to briefly discuss the historical development of short vowels into modern varieties of Goidelic. This is explored by de Búrca (1978), who identifies five stages in the evolution of vowels in Goidelic languages: (1) prediphthongal; (2) latent falling diphthongisation; (3) overt diphthongisation; (4) latent rising diphthongisation; (5) post-diphthongal. This can be illustrated with the verbal root *tuit* 'fall': (1) **tuti* > (2) [tuʲt′] > (3) [tuit′] > (4) [tᵘit′] > (5) [t′it′]. This is a diachronic development from prehistoric Irish (1) up to varieties of southern and western Irish in the modern day (5), but it also captures contemporary dialectal variety across the Goidelic area: "an original vowel is retained on a scale of presence which decreases within the Gaelic-speaking area, varying from segmental in the North to subsegmental in the South" (de Búrca 1978: 403).

In general, Cois Fhairrge Irish vowels reflect a stage (4) or stage (5) situation, but for a non-low vowel in the envirionment /C′_C/, where the second consonant is coronal, it reflects rather stage (2). From the spelling of /ə/ in the Old Irish context, one might infer that the realisation of /ə/ in the context /C_C°/ was that of stage (3) when the second consonant is labial or a velar, but rather stage (2) when it is coronal.

This distribution can be understood by recourse to the term *chromatic transition*, i.e. the point at which the percept of one colour transitions to the percept of another. This is referred to by de Búrca (1978: 396) as the "quality border". The chromatic transition has shifted slowly leftwards through the history of Irish, as captured by de Búrca's five stages schema outlined above. The evidence from Cois Fhairrge, and in this account also from Old Irish, shows that primary localisation plays a significant role

[150] Recall that in Modern Irish there are two consonant colours, referred to here as *broad* and *slender* respectively, in line with the traditional terminology.

in where the chromatic transition occurs. The chromatic transition occurs later in the vowel when the coda consonant is coronal than when it is labial or velar.

The assymetric behaviour of coronal and non-coronal consonants with respect to chromatic transitions recalls proposals that these two classes behaved differently in the historical development of the i-colour (Greene 1973: 130f.). The reintroduction of distinctive u-colour into Old Irish synchronic phonology requires a reevaluation also of the development of consonant colour in the prehistory of the language. While this reevaluation has only just begun (McCone 2015) and serious examination of these developments fall out of the scope of this thesis, consideration should be made of the assymetric behaviour of coronals and non-coronals in future research.

The above subsections have examined the orthography of consonant colour and vocalism in stressed syllables in Old Irish, considering the orthography of vowels of affection and the role of chromatic transitions. The following subsection looks at the orthography of consonant colour and vocalism in unstressed syllables.

3.1.3. The orthography of consonant colour and vowels in unstressed syllables

This subsection examines the orthography of consonant colour and vowels in unstressed syllables. Two distinct contexts must be taken into consideration with respect to unstressed syllables. Firstly, in unstressed non-final syllables and unstressed final syllables which are closed by a (concrete) consonant, there is no contrast between /a/ and /ə/, but rather only /ə/ occurs. In final syllables which end with a vowel on the surface /a/ and /ə/ are in contrast. These are understood in this framework to be closed by an abstract consonant (see 3.2.3.2). 3.1.3.1 examines unstressed vowels before a consonant, where there is no contrast, while 3.1.3.2 looks at surface final vowels, where there is a contrast between /a/ and /ə/.

3.1.3.1. Unstressed vowels before a consonant

With respect to the binary approach, which posits a distinction between /ə/ and /u/ in unstressed non-final syllables, the ternary approach represents a return to the status quo

ante, in which the "quality of unstressed vowels in the interior of words is altogether dependent on that of the flanking consonants" (*GOI*: §101). The following table outlines the orthography of short unstressed non-final vowels according to Thurneysen (*GOI*: §102-3).

Table 24. Orthography of unstressed non-final vowels (*GOI*: §102-3)

Syllable	IəI	IəU	UəI	UəU	AəI	AəU	IaA	UaA	AaA
Closed	*i*	*iu*	*(u)i*	*u*	*(a)i*	*o~u*	*e*	*o~u*	*a*
Open	*i~(e)*	*i(u)*	*u(i)*	*u*	*(a)i*	*u~(o)*	*e~(i)*	*u~(o)*	*a*

As can be seen from the table, the conditioning of unstressed non-final vowels is quite similar to that of short stressed vowels, as is their spelling. Between i-colour consonants the vowel is written <i>, between u-colour consonants it is written <u> and between a-colour consonants it is written <a>. Between an i-colour consonant and an a-colour consonant, <e> is found, and between an i-colour consonant and a u-colour consonant, <iu> is found.

The differences in spelling between open and closed syllables closely mirror the variation one finds between monosyllables and polysyllables in terms of the orthography of short stressed vowels, as discussed in 3.1.2.4, above. The greater variability in spelling in open syllables that Thurneysen remarks on (*GOI*: §103) is due to the fact that in closed syllables there is not always a vowel following the syllable coda to indicate its colour, so a digraph can help to disambiguate. In open syllables, a following vowel often indicates the colour of the second consonant. In such cases, a vowel of affection is redundant.

3.1.3.2. Unstressed final vowels

The situation for unstressed final is somewhat different. Under both the binary and traditional accounts there is a full range of five vowels /i e a o u/ in this position. In the ternary account, where there are only two vowels, /a/ and /ə/, final vowels are seen as combinations of short vowel and abstract consonant, i.e. /a∅ a∅′ a∅° ə∅′ ə∅°/. A brief overview of the distribution and orthography of final vowels is given below, while the topic is returned to in more detail in 3.2.3.2, below.

Unlike in unstressed internal position, or before a final consonant, there is contrast between the two vowels of Old Irish, /a/ and /ə/, in final position. The analysis of final vowels as being closed by an abstract consonant finds parallel in analyses of Marshallese, discussed in 2.2.6, above. In some cases, the abstract final consonant is underlying, either in a lexical item, or in a morphological formative, while in others it is not underlying, but is rather excrescent, as discussed further in 3.3.2.3. The following paragraphs give some examples for the distribution of vowel plus abstract consonant in the nominal system. Further examples can be found among the verbal endings, discussed in 4.3.3.

The ending /-a∅/ is found in the nominative and accusative plural of feminine ā-stem nouns, e.g. *delba* 'shapes', after a-colour; *buidnea* 'troops', after i-colour; and *mucca* 'pigs', after u-colour. The ending /-a∅′/ is characteristic of the nominative singular of io-stem and iā-stem nouns, e.g. the masculine io-stem *daltae* 'fosterling', after a-colour; the masculine io-stem *céile* 'companion', after i-colour; and the feminine iā-stem *ungae* 'ounce', after u-colour. The ending /-a∅°/ is found in the genitive singular of i-stem and u-stem nouns, e.g. masculine i-stem *cnámo* 'bone-gen.', after a-colour; and neuter u-stem *doirseo* 'door-gen.', after i-colour. There are no convincing examples of this ending after u-colour.

The ending /-ə∅/ obviously does not occur, as it is neutralised to /-a∅/ by phonological metaphony (see 3.3.3.3). However, the ending /-ə∅′/ occurs in the nominative plural of masculine io-stem, feminine iā-stem and masculine and feminine i-stems nouns, e.g. io-stem *daltai* 'fosterlings', after a-colour; io-stem *céili* 'companions, after i-colour; and iā-stem *ungai* 'ounces', after u-colour. The ending /-ə∅°/ occurs in the accusative plural of o-stem and io-stem nouns, e.g. masculine io-stem *daltu* 'fosterlings-acc.', after a-colour; masculine io-stem *céiliu* 'companions-acc.', after i-colour; and masculine o-stem *firu* 'men-acc.', after u-colour.

As can be seen from the examples, the range of spellings in unstressed final vowels is different from those found internally. In particular, there is no distinction in the orthography between cases following an a-colour consonant and those following a u-colour consonant. After both, /-a∅/ is spelled <a>, /-a∅′/ is spelled <ae>, /-ə∅′/ is

spelled <ai> and /-ə∅˚/ is spelled <u>. Two main reasons can be put forward to explain this.

A first explanation is phonetic. In general, vowel quality in Old Irish appears to have been dependent on both preceding and following consonants in the case of the main stressed syllable, as argued in 3.1.2 above, and explored in more detail in 3.2.3, below. In final position, however, the not frequent spellings <i> and <e> for <ai> and <ae> in early Old Irish suggest that these vowels were pronounced [i] and [e] respectively. Seeing that there is a cross-linguistic tendency for lengthening in pre-pausa position, one could argue that this final lengthening rendered the off-glide from the last consonant of the root less perceptually salient. In general, the quality of final vowels seems to be more influenced by the following (abstract) consonant colour than the previous consonant colour.

A second explanation makes an appeal to frequency. The occurrence of <i> or <u> in a stressed syllable precludes the occurrence of a-colour in the following consonant. Cases of potential ambiguity in disyllabic words with a final vowel are therefore reduced to instances in which the stressed vowel grapheme is <e> or <o>. In the case of <e>, the following consonant could have a-colour, or it could have i-colour, in which case the spelling <ei> is frequent. In the case of <o> the following consonant could have either a-colour, or u-colour, an ambiguity which was tolerated in Old Irish orthography. This has already been discussed in 3.1.2, above.

In practice, however, initial i-colour is much more frequent than initial u-colour, meaning that <e> and <ei> are correspondingly more frequent than <o> in stressed syllables. The instances of ambiguity between a-colour and u-colour in the consonant preceding a final vowel are limited to those cases in which <o> is found in the preceding syllable, at least for common disyllabic words. In a similar way that the orthography tolerated ambiguity between /C˚aC/ and /C˚aC˚/, spelling the vowel in both instances as <o>, ambiguity was tolerated for final vowels following such constellations as well.

Towards the end of the Old Irish period, /-∅′/ and /-∅˚/ were neutralised to to /-∅/ after /a/, resulting in the spellings <a> for <ae> and <(e)a> for <(e)o> respectively. At a later stage of the language, all final abstract consonants were lost after unstressed vowels. This resulted in the full merger of the two vowels in final position. In Modern

Irish, there is no contrast whatsoever in final unstressed vowels, all of which can be written /ə/, and whose surface timbre is automatically conditioned by the colour of the preceding consonant.

This section has outlined the orthography of Old Irish, and anticipated some of the analysis of its phonology. However, the following sections examine Old Irish phonology in considerably more detail. The static phonology of Old Irish, i.e. its phonological system, is described in 3.2, below, while 3.3 describes the dynamic phonology of the language, i.e. the phonological phenomena which can be observed in Old Irish.

3.2. The Old Irish phonological system

This section discusses the phonological system of Old Irish as it is understood in this thesis. The initial subsection, 3.2.1, lays out the model of phonological representation used in this work, while 3.2.2 outlines the conventions used for the representation of consonants, and 3.2.3 those used for the representation of vowels.

3.2.1. Representational principles

This subsection outlines the phonological framework employed in this work. This model is framed in the language of Cognitive Linguistics (Langacker 1987) and shares many of its assumptions. However, it differs considerably from previous phonological work done within a Cognitive Linguistics framework (i.a. Nathan 1996), in particular in its rejection of the phoneme as a privileged unit of phonological analysis.

The theoretical background of this phonological framework is discussed in 3.2.1.1, below. Broadly speaking, phonology is understood in terms of the perception of phonetic substance, i.e. the acoustic content of speech acts. Cues in the acoustic signal allow the listener to determine phonological form on the basis of fuctional contrast. It is argued that these acoustic cues are perceived through image schemata, which are laid out in 3.2.1.2. Some preliminary observations about the application of this model to Old Irish are discussed in 3.2.1.3, while 3.2.1.4 examines which acoustic cues are likely to be functionally relevant in the language.

3.2.1.1. Philosophical basis of the phonological model

The vast majority of phonological theories view phonology in cognitive terms, rather than as simply a physical manifestation of linguistic behaviour. This was true of many of the structuralists, from Saussure (1916) onwards, on both sides of the Atlantic (i.a. Sapir 1933; Trubetzkoy 1939), notwithstanding what Twaddell (1935) terms a "physicalist" trend in much American structualism, specifically in the tradition linked to Bloomfield.

As regards the generativists, it is interesting to note that although Chomsky (implicitly) sided with many of the structuralists in his mentalist understanding of language, he differed from them in viewing language as an individual rather than social phenomenon. While his review (1959) of Skinner's *Verbal Behavior* (1957) became famous, he actually adopted the individualist viewpoint of that work, something Skinner repeatedly insisted on as being a key innovation of his approach (Skinner 1957: 11, 21, 28, 44 etc.). Otherwise, Chomsky's (1959) terminology is little different from that of Z. Harris (1951).[151] This is in marked contrast to the understanding of language of Saussure, for whom language was both a cognitive and a *social* phenomenon:

> "Si nous pouvions embrasser la somme des images verbales emmagasinées chez tous les individus, nous touchierons le lien social qui constitue la langue. C'est un trésor déposé par la pratique de la parole dans les sujets appartenant à un même communauté, un système grammatical existant virtuellement dans chaque cerveau, ou plus exactement dans les cerveaux d'un ensemble d'individus; car la langue n'est complète dans aucun, elle n'existe parfaitment que dans la masse." (Saussure 1916: 30)
>
> [If we could embrace the sum of the verbal images stored in all individuals, we would touch on the social nexus that constitutes the langue. This is a treasure deposited by the practice of the parole in the subjects belonging to a given community, a grammatical system existing virtually in each mind, or more exactly in the minds of a group of individuals; because the langue is not complete in anyone, it does not exist perfectly except in the mass][152]

This view, in which language is both cognitive and social, had considerable pedigree in the European intellectual tradition. Marx and Engels state that language is "a form of practical consciousness that exists also for other men, and for that reason alone it really exists for me personally as well; language, like consciousness, only arises

[151] Coseriu (1988: 53-7) considers the individual focus implied in Chomsky's term 'ideal speaker-hearer' to already be implicit in the work of Z. Harris.
[152] All translations from French sources are mine, CA.

from the need, the necessity, of communication with other men" (Marx and Engels 1856: 51). In practical terms, this is very similar to the understanding of Tomasello nearly a century and a half later: "language is a form of cognition; it is cognition packaged for the purposes of interpersonal communication" (Tomasello 1999: 150).

One philosophical approach which seems particularly well-suited to understanding the cognitive basis of language as both cognitive and social is phenomenology. While this approach begins from the concrete experience of the subject, it recognises the social nature of phenomena in general (Husserl 1931: 137; Schutz 1932), and of language in particular (Merleau-Ponty 1945: 179; 1960: 95). In phenomenology, cognition is understood to be *intentional*: "conscious processes are also called intentional; but then the word intentionality signifies nothing else than this universal fundamental property of consciousness: to be consciousness of something; as a *cogito*, to bear within itself its *cogitatum*" (Husserl 1931: 72). Put otherwise, cognition must have an object, or objects.

In terms of phonology, one can understand the objects of cognition as the functionally relevant acoustic cues associated to speech acts. The acoustic cues salient to the perception of functional oppositions in one language are likely to be subtly different to those of another, although a great deal of commonality would be expected across human languages in general. While, this commonality is interesting, and indeed has long been a focus of phonological research, for the purposes of what follows it is presumed that the totality of the intentional objects of phonological cognition have a language-specific, or local, rather than universal, ontology. In this work, these objects, which are acoustic variables recoverable from the speech signal, are displayed between pipes, i.e. |acoustic cue|.

Even if there might be differences between languages in terms which cues encode which functional oppositions and how, a certain cross-linguistic uniformity in terms of the ways in which phonological objects are perceived is to be expected, given the essential physiological uniformity of our species, which means that cognition is embodied in one human being in much the same manner as the next. The perception of these phonological objects is held here to conform to the same principles as that of other objects of cognition, the description of which must be psychologically real. This understanding is essentially in accord with the *generalisation commitment* and the *cognitive commitment* of Cognitive Linguistics (Lakoff 1990).

To build a model on this basis, I make use here of image schemata (Johnson 1987; Hampe and Grady eds. 2005). Although this has not been done before to my knowledge, it seems quite logical, given how image schemata are understood in contemporary work within a Cognitive Linguistics framework: "we should not think of image schemas as something we conceptualise (which the term image might suggest), but as cognitive abilities inherent in the conception of other entities" (Langacker 2006: 36). The other entities in this instance can be considered the functionally relevant acoustic cues found in the speech signal. The principal image schemata relevant to phonological cognition are presented in the following subsection.

3.2.1.2. Image schemata in phonology

This subsection presents the architecture of the phonological model adopted in this work. This architecture is based on the notion of image schemata, which are understood as cognitive abilities inherent in the conception of phonological objects, i.e. acoustic cues. The principal image schemata defined in the following paragraphs are *process*, *cycle* (Johnson 1987: 119-21), and *path* (Johnson 1987: 113-7). A further notion adopted from Cognitive Linguistics, *scale,* is also relevant to the model, and is discussed after the three principal image schemata.

The *process* image schema captures the essentially linear perception of speech,[153] roughly equivalent to what Saussure (1916: 64) calls the acoustic chain, the perceived procedural nature of contiguous speech. The specific understanding of the term *process* here means that the term *phonological process* to describe assimilation, dissimilation, metathesis, syncope and the like, is strictly avoided throughout this work, and the alternative term *phonological phenomenon* is used in its stead. The phonological phenomena of Old Irish are discussed in section 3.3, below.

The *cycle* image schema is relevant because acoustic cues are recursive. Some languages permit only CV syllables, in which case the acoustic cues will repeat in a fixed fashion, from those relevant to the identification of the consonant, to those

[153] The word linear already invokes the universal spatial metaphor for time. While the use of space as a metaphorical source domain for time is likely to be a human universal, that does not mean that the actual mapping of the relationship is identical cross-linguistically (Núñez and Sweetser 2006).

relevant to the identification of the vowel, and back again. The idea of a cycle understood in this way is broadly compatible with the incipient syllabic theory of Saussure (1916: 79-91; see also Grammont 1933; Coursil 1998). In the current framework, the *cycle* replaces the concepts of both phoneme and syllable in classical phonology, and can be seen as the basic unit of phonological analysis, being, as it is, a natural segmentation of the cycle. Combining the image schemata of process and cycle allows us to speak of speech being perceived as a *cyclical process*.

This idea of the cycle has something in common with CVCV-phonology (Scheer 2004), where phonological structure is understood to involve repeated CV structures. However, the universality of the consonant-vowel distinction is questionable, as chapter 2, above, has shown (see also Comrie 1993), and it is the principle of recursion itself that is likely to be universal, not the structure of the phonological cycle. Phonetically, a strict division between vowel and consonant in syllables is wrong-headed, as many of the acoustic cues for the identification of both are found at the consonant-vowel transition, an insight captured in the Onset Prominence framework of G. Schwartz (2013, 2015, 2016). In the model adopted here, there is no theoretical distinction between consonant and vowel, but the practical distinction between the two emerges rather from the language-specific categorisation of acoustic cues on functional criteria.

The *path* image schema refers to the fact that acoustic cues tend to be thematically grouped, i.e. multiple acoustic cues are relevant to the same phonological contrast and are only marginally relevant, or even irrelevant, to other phonological contrasts. A number of phonetic cues might go into distinguishing laryngeal features (Trubetzkoy 1939: 146-8), all of which can be seen to co-occur on the same path.

On the other hand, the acoustic cues relevant to the identification of, say, obstruent location, are not the same as those relevant to the identification of vowel height. The former might be identified primarily by |formant transitions| and |release burst|, indexed to one path, termed *localisation*, the latter by |first formant|, indexed to another, termed *height*.

Paths cut across cycles: each cycle consists of acoustic cues associated to certain paths, recurring in a more or less fixed manner. The intersection of a cycle and a path is referred to here as a *node*. Nodes can be *empty*, meaning that the acoustic cues associated to that particular path do not occur in a given cycle. For example, while a cycle contains acoustic cues typically associated with both consonants and vowels, for

an initial vowel, the acoustic cues associated to consonants may simply not occur. Similarly, in a cycle containing a lateral /l/ and a vowel the acoustic cues relevant to consonant localisation might not be salient. However, nodes are typically *specified*, meaning that they are host to a phonological specification. This is discussed in more detail below.

Some phonological phenomena are specific to a given path, and typically do not require reference to other paths. As an example, one might consider the case of vowel height harmony, in which all the vowels in a certain phonological domain must be of the same height. In such cases, one might hypothesise that there is a path, *height*, to which is indexed the acoustic cue |F1|, and that this path has a uniform specification across the domain in which the vowel height harmony is active.

This notion of path thus allows many of the insights of Autosegmental Phonology (Goldsmith 1976; McCarthy 1979) to be integrated into the model. It also captures the notion of prosody in the Firthian tradition, in that a prosody can be understood as a phonological specification on a given path which typically extends across a domain larger than that occupied by a single cycle. To the extent that this understanding of phonology is not segmental, it is also compatible with some of the with insights of Articulatory Phonology (i.a. Browman and Goldstein 1992), in which articulatory gestures of different durations are considered the basic units of analysis.

The three image schemata of *process*, *cycle* and *path* comprise the basic architecture of the phonological framework adopted here. However, a further image schema, *scale*, must also be considered. While Johnson (1987: 121-4) defines scale as a separate image schemata, subsequent studies see it as being inherent already in other schemata: "almost all domains make some reference to scales; for example, any domain involving gradable properties" (Clausner and Croft 1999: 21). The majority of acoustic cues, which are here understood as the objects of phonological cognition, are gradable in this sense.

At this point it is necessary to invoke the principle of categorical perception in phonology (Lieberman et al. 1957). While given acoustic cues may have gradient values, our perception of those acoustic cues tends to be categorical. Given that "scale is an abstract parameter of degree which combines with other concepts" (Grady 2005: 39), it is possible to posit discrete scalar categories associated to given acoustic cues. To

take the oft-cited case of |voice onset time| as an example, two distinct categories of {high} and {low} might distinguish voiceless from voiced stops.

In reality, however, a number of acoustic cues are generally grouped on a given path. Put otherwise, more than one acoustic cue is usually relevant for the perception of a functionally relevant linguistic contrast. To capture this, I borrow the term *percept* from Swadesh (1934: 118) to describe the gestalt perception of acoustic cues characterising a given functional contrast. Percepts are necessarily specific to a given path, and can be considered to characterise nodes on that path. In this work, percepts are displayed between curly brackets, i.e. {percept}.

In keeping with the notion of scale, discussed above, two basic percepts are posited in this work, namely high {H} and low {L}, with the possibility of an intermediate value, {o}, which is often also employed. In addition to these, there is a further image schema, *end of path* (Lakoff 1987: 440-1), which is relevant here. This can be understood as constituting the end point of a *path* and is here considered to be percept represented as {ʔ}.

Most often the percept {ʔ} corresponds to a period of silence on a given *path*. There are a number of reasons to insist that silence is a phonologically relevant category. Firstly, the acoustic signal of stop consonants contains a period of silence critical to their perception as a distinct class (Dorman et al. 1979).[154] Secondly, the recognition of silence as a perceptual category helps to give a principled account of boundary phenomena such as those discussed by Scheer (2004: 96-104). Thirdly, recent research has explored the importance of silence to syntax and the syntax-phonology interface (Tokizaki 2008).[155]

At this point, it is perhaps worthwhile disambiguating the percepts {o} and {ʔ} from the notion of an empty node, and in this respect, a musical metaphor is apt. One might consider the distinct paths to be analogous to the strings of a stringed instrument, such as a guitar, while a cycle corresponds to a chord. The percept {ʔ} involves the intentional silencing of a given string, while the percept {o} corresponds to the tonic

[154] It should be noted, however, that stop closure is not represented with the percept {ʔ} in the account of Old Irish given below.

[155] The recognition of silence as a phonologically relevant category is in tune with its importance in a number of other linguistic studies (e.g. Johannesen 1974; Sobkowiak 1997; Jaworski 2005). The idea of silence as itself having content, rather than just being the absence of content, also fits with conceptions of it in other fields of research in the humanities, such as literary criticism (e.g. Steiner 1967; Sontag 1969) and philosophy (e.g. Sartre 1948, 30; Palmquist 2006).

being sounded on that string. Both {ʔ} and {o} thus involve intentional interaction with a given string. When a node is empty, on the other hand, one can consider the string as not being played at all, in which case it may resonate in harmony with other strings played in the chord.

A final representational convention used in this phonological framework is the notion of *intensification*. Given percepts may be considered to be either *intensified* or *attenuated*. To extend the musical metaphor from above, an intensified percept can be understood as being sounded *forte*, and an attenuated one as sounded *piano*. Intensification not infrequently corresponds to gemination[156] and identical adjacent attenuated percepts can be expected to combine to yield a single intensified percept. In this work, intensified percepts are represented underlined, e.g. {H}, while attenuated ones are not, e.g. {H}.[157]

This concludes the exposition of the architecture of the phonological model adopted in this work. The next two subsections give an overview of how this model can be applied to Old Irish. 3.2.1.3 looks at the structure of the cycle in Old Irish, while 3.2.1.4 discusses the acoustic cues salient to each path.

3.2.1.3. Cycle and path in Old Irish phonology

The identification of what paths are relevant for the perception of speech in a given language must be based on the phonological phenomena that occur in that language. In the case of Old Irish, it is necessary to posit five distinct paths, which can be labelled stress, height, colour, manner, and localisation.

These paths differ in terms of their importance for determining prosodic constituency. A cycle in Old Irish phonology must minimally contain specified nodes on the paths of stress, height, and colour, but nodes specifying manner and localisation need not occur. Put otherwise, empty nodes are only possible on the paths of manner and localisation. Furthermore, the occurrence of empty nodes on these paths involves a de-

[156] This gemination may be merely virtual, in the sense of Ségeral and Scheer (2001).

[157] The convention of underlining is adopted from that used in Government Phonology (Kaye, Lowenstaam and Vergnaud 1985; Kaye 1989; Harris and Lindsey 1995) for the sometimes vague notion of *headedness*. Coleman (1992) gives an overview of the concept of headedness in phonology up to that point, while a special issue of the journal *Glossa* on the topic is forthcoming at the time of writing.

pendency relationship, in that, within a given cycle, if the manner path has an empty node, then the node on the localisation path must also be empty, while the reverse is not true. This is discussed further in the following paragraphs.

The different configurations of specified nodes within a given cycle define natural classes. Broadly speaking, a cycle with empty nodes for both manner and localisation defines an abstract consonant (see 3.2.2.3), one with an empty node for localisation defines a sonorant (see 3.2.2.2), while one in which all nodes are specified defines an obstruent (see 3.2.2.1). These different types of cycle are shown in the table below.

Paths are ordered from top to bottom in the approximate order in which the acoustic cues indexed to them recur in the process, i.e. first cues to localisation, then cues to manner, then those identifying colour, height, and stress. Below, and throughout the remainder of this work, the cover symbol /C/ is used for any consonant, while /T/ is used for any obstruent and /R/ for any sonorant. The symbol /V/ describes any vowel, in this case either /a/ or /ə/.

Table 25. Types of cycle in Old Irish phonology

Path	Abstract C	Sonorant	Obstruent
Localisation			ε
Manner		δ	δ
Colour	γ	γ	γ
Height	β	β	β
Stress	α	α	α
Transcription	/∅(V)/	/R(V)/	/T(V)/

As can be seen from the table, the degree of specification of a cycle is inversely proportional to its sonority profile. Old Irish permits (syllable) initial TR-clusters, e.g. *druí* ‘druid’, but not RT-clusters, e.g. ***rduí*. In final position, RT-clusters are licit, e.g. *cert* ‘right’, but TR-clusters are not, e.g. ***cetr*. Illicit clusters are subject to repair through epenthesis, as discussed in subsection 3.3.2.2, below.

Generally speaking, clusters share values for colour, height and stress. For this reason, the licit clusters, i.e. those of obstruent and sonorant in the onset, and those of sonorant and obstruent in the coda, can be understood to belong to a single cycle, with two distinct specifications on the path of manner. A node with two such specifications is considered to have a *complex specification* in what follows. Insofar as they are defined within a single cycle, clusters is a somewhat misleading term, and I adopt the term

segment, strictly in the sense used by Kuipers (1960: 55), for both ordinary consonants and these clusters, with due reservation.[158] Segments are represented by the cover symbol /X/ in this work. The following table shows schematic representations of the principal types of segment recognised in what follows.[159]

Table 26. Types of segment in Old Irish phonology

Path	Obstruent	Sonorant	Abstract C	TR-cluster	RT-cluster
Localisation	ε			ε_T	ε_T
Manner	δ	δ		$\delta_T\delta_R$	$\delta_R\delta_T$
Colour	γ	γ	γ	γ	γ
Height	β	β	β	β	β
Stress	α	α	α	α	α
Transcription	/T(V)/	/R(V)/	/∅(V)/	/TR/	/RT/

In reality, a greater range of segments than those shown above can occur in Old Irish, although not usually in underlying morphemes. In morphologically complex words, it is not uncommon to find a cluster of two obstruents, or of a sonorant, an obstruent, and another sonorant in intervocalic position. When they occur in the same prosodic constituent (in the terms explained in 1.2.2 and in 4.1.3), these share a specification for colour. When they belong to different prosodic constituents, as is the case, for instance, in nominal compounds, or across the boundary between *iairmbéarla* and *focal*, or in the early period also between *focal* and *barr*, no assimilation of colour occurs (see 3.3.3.2).

The minimal phonological phrase in Old Irish consists of two cycles, one of which must be specified {H} on the path of stress, corresponding to primary stress (see also 3.3.2.1). Two cycles corresponds to a CVC syllable in conventional notation, or, more correctly, to an XVX syllable in the terminology adopted here. The second segment may be an abstract consonant, in which case the minimal word has the shape XV∅. As explained in subsection 3.2.3.3, below, a cluster of vowel plus abstract consonant corresponds to a surface long vowel or diphthong. Illicit XV structures are subject to repair through the excresence of a following abstract consonant, as discussed further in 3.3.2.3.

[158] The use of this term is not meant to imply either that the process can be meaningfully subdivided into discrete segments. It is used purely as useful a cover term for the consonantal portion of a given cycle, i.e. that portion including nodes specified for colour, manner, and localisation, whether or not the specification on the manner path is simple or complex.

[159] As can be inferred from the table, vowels are not considered to be segments in the definition adopted here.

Encoding sonority as a structural property of representations is not new in phonology. The system used here bears a family resemblence to the Onset Prominence framework of G. Schwartz (2013, 2015, 2016).[160] One difference is that the "trees" of Schwartz's framework, which correspond roughly to the cycles of the model adopted here, have some claim to universal validity, as they define acoustic events in an archetypal CV syllable, to which melody specifications attach. The cycle types laid out here, in contrast, are ad hoc, designed specifically with Old Irish in mind. Paths are defined by the common function of the acoustic cues which compose them, and are thus emergent.

This subsection has laid out the basic structure of the cycle in Old Irish phonology. The following section examines the individual paths, and in particular the acoustic cues of which they are composed.

3.2.1.4. Cues and paths Old Irish phonology

This subsection defines the acoustic cues which compose the paths which are relevant in Old Irish phonology. Cues defining the paths of stress, height, and colour, which are relatively straightforward, are discussed first, after which the cues relevant to manner and localisation, which are somewhat more complex, are examined.

The acoustic cues relevant to the identification of *stress* likely include |duration|, |amplitude|, and pitch, |f0|. By all of these metrics, more strongly stressed syllables can be considered high with respect to more weakly stressed ones. On the surface, Old Irish has two degrees of stress, i.e. stressed and unstressed syllables. However, a phonological rule, known as syncope, deletes every second, non-final vowel, with a number of easily identifiable exceptions (see 3.3.2.1 and 4.2.1.2).

To capture this behaviour, it seems best to posit three degrees of stress at the underlying level, labelled here fully stressed, unstressed, and ephemeral, for which the percepts {H}, {o}, and {L} can be posited. Extending from the left edge of a lexical word, the first cycle has a {H} specification on the path of stress, the next has an {L}

[160] Many versions of Element Theory consider more sonorant segments to have fewer elements, and directly correlate the ability of a segment to license empty nuclear positions to the number of elements in its composition.

specification, the next a {o} specification, the next an {L} specification, and so on, with alternate cycles having {o} and {L} specifications, within the domain of the *focal*, including both the lexical word and any additional formatives. A phonological rule determines that the final vowel of the *focal* must have an {o} specification, while another acts to delete all the ephemeral {L} specifications, leaving behind only a {H} specification indicating primary stress, and {o} specifications, indicating the lack of stress.

In addition to the {H}, {o}, and {L} specifications, nodes on the path of stress can also be specified {ʔ}. The final cycle of the *focal* in Old Irish is always marked by the percept {ʔ} on the paths of both stress and height, representing a boundary on the right edge of the phonological word. This means that the final cycle of the focal is always specified {ʔ} on the path of stress, while the penultimate cycle is always specified {o} on the path of stress. The details of the stress system in Old Irish are discussed further in 3.3.2.1, below.

As stated in 2.1, above, the relevant acoustic cue for the *height* path is likely to be the first formant, i.e. |F1|. Vowel height is inversely proportional to |F1|, in that the higher the |F1| the lower the vowel, and the lower the |F1|, the higher the vowel, all other things being equal.[161]

In many, probably most, languages of the world, both |F1| and |F2| are primarily vocalic in character, serving to differentiate vowels along the high-low and front-back axes respectively. However, in languages with vertical vowel systems, such as those discussed in chapter 2, and also in Old Irish, only |F1| can be considered to be a vocalic property, while |F2| is a property of consonants, or of a larger prosodic domain.

As only two vowels are posited here for Old Irish, transcribed /a/ and /ə/, only two percepts, {H} and {L} are necessary to identify them. There is scope for confusion here, as if the percepts are defined on the basis of the acoustic cue, i.e. |F1|, then a high value corresponds to what is conventionally termed a low vowel, i.e. /a/, whereas a low

[161] It should be noted that when vowel formants are under discussion, a simple arithmetic scale is not a good basis for modelling. Auditory perception of frequency can be better understood in terms of critical bands, such as those of the Bark scale (Zwicker 1961), the progression of which is logarithmic rather than arithmetic at frequency ranges above 500Hz (Traunmuller 1990:98). Syrdal and Gopal (1986) put forward a perceptual model of vowel recognition of American English vowels in which high vowels are identified when the difference between |F1| and |f0| is less than three bark, while front vowels are identified when the difference between |F2| and |F3| is less than three bark, thus identifying a critical distance for what they refer to as a "spectral center of gravity effect".

value corresponds to the relatively higher vowel, /ə/. In what follows, I have favoured the conventional terminology, using the percept {L} on the path of height for the low vowel /a/, while the mid-high vowel /ə/ is represented rather with {H}. In addition to these, the percept {ʔ} is employed to mark the right edge of a stressed word, as discussed above.

As discussed in the preceding subsection, in the representational framework adopted here, there is a path defining obstruent localisation, correlating broadly to what is often referred to as *place of articulation* in much phonological literature. Sometimes, however, languages exhibit further contrasts of localisation subsidiary to the primary one. Contrasts of this nature are referred to as by Trubetzkoy (1939: 129ff.) and are often discussed under the rubric of *secondary articulations* (i.a. Weijer 2011) in more recent linguistic literature, which tends to favour articulatory terminology. In this work, the noun *colour* is used instead, alongside the adjective *chromatic*, where appropriate.

As regards the acoustic correlates of the path of *colour* in Old Irish there is a certain amount of evidence from modern Goidelic varieties. Ní Chiosáin and Padgett (2012) clearly identify the importance of second formant transitions, i.e. |F2 transitions|, in the identification of the broad-slender contrast in Modern Irish (see also Bennett et al. 2014). Although there are other cues, such as the spectral shape of the release burst, and perhaps also |VOT|, the |F2 transitions| appear to be the primary cue to the identification of this distinction. By and large, this is also true of other languages with a similar contrast, such as Russian (Jakobson et al. 1951: 31; Padgett 2001; Kochetov 2006), and corresponds also to the situation in Marshallese (Choi 1992, 1995).

Even more interesting are studies from the modern varieties of Goidelic which have a three-way contrast in colour for at least some sonorants, as is proposed here for the entire consonant system of Old Irish. For Gaoth Dobhair Irish, Ní Chasaide (1979) found that the |F2| of plain laterals was intermediate between that of broad laterals and that of slender laterals. Exactly the same result was found by Ladefoged and colleagues (1998) in their phonetic study of Bernera Gaelic.

In light of these findings, it seems principled to consider |F2 transitions| to be the primary acoustic cue to the identification of colour distinctions also in Old Irish. Higher |F2 transitions| are characteristic of i-colour, intermediate ones of a-colour, and lower ones of u-colour. Hence, on the path of colour, i-colour consonants are specified by the high percept {H}, a-colour consonants by the intermediate one {o}, and u-colour

consonants by the low percept{L}. The percept {ʔ} does not occur on this path, nor is an empty node possible, meaning that the path of colour is unique among the paths in this description of Old Irish phonology, in that must be specified for a scalar percept at each individual node along the path.

As regards the path of *manner*, Old Irish distinguishes a class of obstruents, which are specified on both the manner and localisation paths, and a class of sonorants, which are specified on the path of manner, but not on that of localisation, as laid out in 3.2.1.3, above. The specification of obstruents on the path of manner differs in many respects from that of sonorants. The situation with respect to obstruents is dealt with first below, then that with respect to sonorants.

Old Irish distinguishes aspirated, unaspirated, and nasal stops at three different localisations. While the distinction between, e.g. /b/ and /p/, or /d/ and /t/ has sometimes be described in terms of the feature [voice], there seems to be little doubt that it is rather the presence or absence of aspiration which distinguishes such pairs. The stops of modern varieties of Scottish Gaelic are generally described as being entirely lacking in [voice], with aspiration distinguishing the two categories (Ladefoged 1998). Although the situation in varieties of Modern Irish is not so extreme, there is still no doubt that it is an *aspiration* language in terms of the distinction between "voicing" and "aspiration" languages (see C. Anderson 2013).

While oral stops are characterised by the presence or absence of aspiration, it is only the nasal stops which can be considered truly voiced. The nasalisation mutation, discussed further in 3.3.1.4, causes the aspirated stops be deaspirated, and the unaspirated stops to become nasals. Phenomena such as this in Irish and other languages led Gnanadesikan (1997: 87ff.) to propose a ternary scale for inherent voicing, differentiating "voiceless obstruents", "voiced obstruents" and "sonorants". While Gnanadesikan's terminology is incompatible with the account given here,[162] the basic mechanism of a ternary scale is in tune with how aspirated, unaspirated, and nasal obstruents are analysed in this work.

The nasalisation mutation is compatible with Old Irish obstruents being characterised by the percepts {H}, {o}, and {L} on the path of manner. The percept

[162] Her terminology is incompatible for two reasons. Firstly, as discussed above, [voice] is not considered relevant for the differentiation of the the two classes of oral obstruents in Irish. Secondly, as explored further below, the obstruent nasals under discussion here cannot be considered sonorants in Old Irish, as their phonotactic patterning groups them rather with the oral obstruents.

{H} characterises aspirated obstruents, while {o} characterises unaspirated obstruents, and {L} nasal obstruents. The nasalisation mutation can thus be seen as entailing the addition of an {L} specification on the path of manner, as laid out in more detail in 3.3.1.4.

As regards the acoustic cues which compose the path of manner, it seems reasonable to consider |voice onset time| (henceforth |VOT|) as being a salient acoustic cue. The aspirated obstruents are likely to have had considerable lag before the onset of voicing, while for the unaspirated obstruents are likely to have a short lag, with the onset of voicing coinciding quite closely with the release of the stop. This distribution is in keeping with that in modern Goidelic varieties, and indeed with "aspiration" languages more generally. As regards the nasal obstruents, they are inherently voiced, with the onset of voicing occurring before release.

At this point, it is necessary to further define the two major classes of obstruents and sonorants. The class of Old Irish obstruents includes oral stops, fricatives, and some nasals. Obstruents distinguish three degrees of localisation and, insofar as the stops and labial fricatives are concerned, distinguish aspirated, unaspirated, and nasal, as discussed above.[163] In addition to these, one must consider /s/ and /h/, which do not partake in the same system of oppositions as the other obstruents. They can be considered to be inherently aspirated, but have no corresponding unaspirated or nasal consonants, nor do they fit easily into any of the three consonant localisations of labial, coronal, and velar, discussed below. For /s/ and /h/, the term *spirant* is reserved in what follows, to differentiate them from the class of *fricatives*, which behave like other obstruents in terms of manner and localisation contrasts.

As discussed above, the class of sonorants are specified on the manner path, but not on that of localisation. Old Irish had three distinct types of sonorant: nasal, lateral, and rhotic. The nasal *sonorant* can be distinguished from the nasal *obstruents* by phonotactic behaviour. A nasal sonorant cannot be followed by another sonorant word initially, while a nasal obstruents can. Thus, a word such as *mná* /mna∅/ 'women' is perfectly licit in Old Irish, as /m/ is an obstruent, there are no words of the form e.g. ***nlá*, as both /l/ and /n/ are sonorants.

[163] While there is a nasal bilabial fricative in Old Irish, there are no coronal or velar nasal fricatives.

To confuse matters, there is a nasal obstruent with coronal localisation, but the nasal sonorant is typically also coronal in terms of articulation, although in this account the sonorants are not specified on the path of localisation. Under the nasalisation mutation, discussed in 3.3.1.4, below, clusters of the coronal nasal obstruent /N/ or the velar nasal obstruent /ŋ/ plus a sonorant are found, e.g. *i ndruimm* (Arm17a2) 'back' /N˚r˚əm′/, nasalised after *i*^{N} 'in'; *ngnimae* (Ml13d15) /ŋ′n′ə∅′μa∅′/ 'deeds', nasalised after the genitive plural article *inna*^{N}; *nglanad* (Ml105d4) /ŋlanað/ 'cleaning', nasalised after the first person plural possessive *ar*^{N}. Further examples can be found in C. Anderson (2012).

It is reasonable to assume that the sonorant nasal has the same specification on the path of manner, i.e. {L}, as the obstruent nasals discussed above. Indeed, this tallies well with the fact that vowel initial words begin with a sonorant nasal under the nasalisation mutation. To all extensive purposes, the nasalisation mutation can thus be seen as entailing the fusion of a sonorant nasal, unspecified for manner, to the initial consonant, be it abstract or concrete, of the following word.

The situation with the lateral and rhotic is not so clear, but according to Ladefoged and Maddieson 1996: 193, 244) laterals tend to have high |third formant| (henceforth |F3|), while rhotics, on the other hand, tend to exhibit a low |F3|, although this is not uniform for rhotics in all languages. Indeed, it is difficult to establish consistent acoustic correlates for the heterogenous group of sounds considered as rhotic, leading some to consider the various sounds captured under this rubric as merely sharing a family resemblance (Lindau 1985).

The traditional descriptions of modern Goidelic dialects generally speak of the rhotics as being fricatives, or sometimes flaps, but there has not been much phonetic work on this class to date. In their work on the phonetics of Bernera Gaelic, Ladefoged and colleagues (1998: 16) describe the rhotics of that language as being voiceless approximants. In a study of the rhotics of two Connemara Irish speakers, C. Anderson and Jaworski (2015) found considerable variation, but most tokens were fricatives or approximants, with trills and taps being considerably more infrequent.

These studies give some support to the hypothesis that Old Irish rhotics were also characterised by a low |F3|.[164] This being the case, and highlighting the need for further study in this area, |F3| is likely to have been the primary acoustic cue for the identification of Old Irish rhotics as well. In light of this, one can posit that Old Irish rhotics had a specification for low |F3| on the path of manner, while laterals had a specification for high |F3|.

In order to formally differentiate these specifications from those of obstruents, and taking into account the particular phonotactic properties of the sonorants, lower case, rather than upper case letters are used for these in the representations below. Thus the laterals are represented below with the lower case high percept {h}, and the rhotics with the lower case low percept {l}.

The class of sonorants, i.e. the sonorant nasal, the lateral, and the rhotic, show a contrast between what are traditionally described as *fortis* and *lenis* sonorants. While the distinction between the two is somewhat unclear, the fortis sonorants are typically described as being longer in duration, and more forcefully articulated than their lenis counterparts. In descriptions of varieties of Modern Irish, the reflexes of the lenis sonorants are typically alveolar, while those of the fortis sonorants are dental (i.a. Mhac an Fhailigh 1968: 38f.). In the representational model used in this work, the fortis sonorants are considered to have *intensified* specifications with respect to the lenis sonorants, whose specifications can be considered *attenuated*. The same formal mechanism distinguishes stops from fricatives, as discussed further below.

There are good grounds for this analysis of the Old Irish sonorants. Firstly, initial sonorants have intensified specifications, which are then attenuated under the lenition mutation (see 3.3.1.4). This is parallel to the behaviour of the stops, as explored below. Secondly, in coda position, the lenis or attenuated sonorants are generally written singleton in Old Irish, i.e. <n, l, r>, while the fortis or intensified ones are written double, i.e. <nn, ll, rr>. Formally, intensification frequently correlates with gemination in the current framework.

Having discussed the paths of stress, height, colour, and manner, the last remaining path which must be discussed is that of *localisation*. This corresponds to

[164] A study of coronal rhotic fricatives in the Lolo-Burmese language Nusu by Ikeda and Lew (2015) also identifies low |F3|, although Ladefoged and Maddieson (1996: 244) claim that this is not the case for the fricative rhotic of Czech.

what is conventionally known as *primary place of articulation*, or *primary localisation*, and may be contrasted to the path of *colour*, which corresponds to the common notion of *secondary place of articulation*, or *secondary localisation*.

Obstruents in Old Irish exhibit a three-way distinction in primary localisation, for which the articulatory cover terms labial, coronal and velar are largely adequate. Considerable research has gone into the acoustic correlates of distinctions in primary localisation and there are at least two types of acoustic cue which can be incorporated into phonological representations of localisation: transition cues and noise cues.

With respect to transition cues, variations in |F2 transitions| at consonantal release were already been identified in Jakobson et al. (1951: 29-30) as a likely cross-linguistically relevant cue to localisation independent of consonant class. Second formant at release is lowest for labials, somewhat variable for coronals, and highest for velars (Delattre et al. 1955). Subsequent studies showed also differences in the third formant transitions, which are high for coronals while velars show a convergence of the second and third formants (Fant 1960: 198).

As for noise cues, Stevens and Blumstein (1978: 1367) found that for stops the gross spectral shape "determined both by the burst of acoustic energy at the release and by the initial portions of the formant transitions" was adequate for identification of localisation, even without additional release burst information. Blumstein and Stevens (1979: 1003ff.) argue that these spectral shapes can be understood as invariant templates, corresponding closely to the classical binary acoustic features of Jakobson et al. (1951), with labials characterised as diffuse–falling, coronals as diffuse–rising and velars as compact.

In Feature Geometry (e.g. Clements and Hume 1995), frontness in vowels is generally taken to correspond to the feature [coronal], while backness corresponds to the feature [dorsal], and roundedness in vowels with the feature [labial], which corresponds partially to the first position, in which coronals are associated with [i]. Within a Dependency Phonology framework, Weijer (1996) explicitly associates labials with [u], coronals with [i], and velars with [a]. However, it is not uncommon for phonologists to consider coronals as being somehow *unmarked* either (see the discussion in Kenstowicz 1994: 516-21).

Among practitioners of Element Theory, there is widespread agreement that labials are characterised by the element |U|, but considerable dispute over the representa-

tion of coronals and velars. Cyran (1997), on the basis of his analysis of Munster Irish associates coronals with the element |A| and considers velars to be inherently placeless. Backley (1993), on the other hand, argues rather in favour of placeless coronals, but later (2011: 69ff.) rather that some coronals have the element |I| and some the element |A|, while velars, like labials, have |U|.[165]

There is some phonetic evidence from modern Goidelic varieties for arguing that coronal behaves differently from other localisations. They are more frequent than labials or velars (de Búrca 1960; C. Anderson 2013) and clusters of sonorant and coronal stop are also less liable to be broken up by epenthesis than clusters of sonorant plus labial or velar, e.g. *ard* 'high', without epenthesis between /r/ and /d/, but *dearg* 'red', with epenthesis between /r/ and /g/.

As regards the situation in Old Irish, there is some evidence that velars and labials function as a natural class, to the exclusion of coronals. Pokorny (1913 §61-§63) claims that labials and velars attract u-colour in a way that coronals do not. There is also an assymetry in the orthography, discussed in 3.1.2.5, whereby a high vowel between an i-colour and u-colour consonant is written <iu> when the latter is a labial or velar, but varies between <i> and <iu> when it is a coronal. For example, the spellings *rith* 'running' (e.g. Sg108b3) and *riuth* (e.g. Sg106b8), where the coda is coronal, are in free variation in Old Irish orthography, while one such as *gigrann* 'wild goose' (Sg36a5) is absolutely exceptional, with <iu> being overwhelmingly used instead.

A last consideration is the fact that sonorants, even though they are not specified for localisation in the representations put forward here, are coronal from the articulatory point of view. In particular, their behaviour with regard to the orthography coincides with that of coronal obstruents. This being the case, it seems plausible to treat coronals differently from labials and velars in Old Irish.

The spectrum of the |release burst| is likely to be the most important acoustic cue for the identification of *localisation*, or primary place, in Old Irish, given that |F2 transitions| are likely to play a key role in the identification of *colour*, or secondary place. However, given the behaviour of coronals it seems most principled to consider them as being characterised by a neutral percept {o}, which in the musical metaphor

[165] I have used pipes rather than curly brackets to represent elements, as these seem to generally be understood as correlating directly to patterns in the acoustic signal. This is explicit in Backley (2011), although the work of other practitioners (e.g. Harris and Lindsey 1995) is more amenable to a reading of elements as perceptual rather than purely physical entities.

presented in 3.2.1.2, corresponds to the tonic, or default melody. This captures the fact that the sonorants pattern with the coronal obstruents in terms of orthography, as the environment conditioning an early chromatic transition (see 3.1.2.5) can be defined as either a {H} or {L} percept on the path of localisation. The percept {L} on the path of localisation can be considered to characterise labials, while {H} characterises velars.

It was described above how fortis and lenis sonorants are distinguished in this work by the former being considered to have *intensified* specifications, while the latter have *attenuated* specifications. On the path of localisation, a parallel contrast can be observed among the obstruents. An intensified specification on the path of localisation correlates to full stop closure, while an attenuated specification correlates to fricative release.

There is good evidence for this analysis in Old Irish, as in some senses, stops can be considered as geminate fricatives. Under the lenition mutation (see 3.3.1.4, below) stops are lenited to fricatives. When two homorganic fricatives fall together in Old Irish, the result is the corresponding stop (cf. *IGT*i §41ff.). For example, the deponent verb midithir 'judges' has the verbal stem /mʹəðʹ/. When the present deponent second person singular ending /-əθʹər/ is added to the stem, the second vowel of the resulting complex (i.e. /mʹəðʹ-əθʹər/ is subject to syncope (see 3.3.2.1), causing the two coronal fricatives to fall together. The resulting word is ·*mitter* /mʹətʹər/ (Wb6b22), where the two coronal fricatives have been resolved to an aspirated coronal stop.

This subsection has laid out the acoustic cues likely to compose the paths identified in this description of Old Irish phonology, and briefly outlined the percepts which can occur on each path. The next two subsections go into detail about the actual distribution of these percepts, and make some remarks as to their phonetic implementation. Section 3.2.2, below, looks at the paths defining the consonantal portion of the cycle, i.e. localisation, manner, and colour, while 3.2.3 examines rather the vocalic portion of the cycle, namely the path of height, as well as the interaction of height and colour.

3.2.2. Localisation, manner, and colour

The above section laid out the phonological model which has been adopted in this work, while this section outlines representations for the consonants of Old Irish, examining specifically the paths of localisation, manner and colour. The table below lays out the system of concrete consonants found in Old Irish, using a reading transcription[166] and familiar articulatory categories. It should be kept in mind that all of the consonants laid out below can be specified for i-colour, a-colour or u-colour.

Table 27. The concrete consonants of Old Irish

	Labial			Coronal			Velar			∅
Obstruents	+ asp	-asp	+ nas	+ asp	-asp	+ nas	+ asp	-asp	+ nas	+ asp
Stop, /s/	p	b	m	t	d	N	k	g	ŋ	s
Fricative	φ	β	µ	θ	ð		x	ɣ		h
Sonorants				+ lat	+ rhot	+ nas				
Fortis				L	R	N				
Lenis				l	r	n				

In the table above, the sibilant /s/ and the glottal fricative /h/ have been described as inherently placeless, in spite of the fact that /s/ is coronal in articulatory terms. This follows the logic of the peculiar behaviour of these consonants in Old Irish, and the corresponding particularity of their representation, as laid out below. In the table above, the sonorants, in contrast, have been classed as coronals in spite of the fact that localisation is not considered here to be relevant to their phonological representation. This is defensible on the grounds that coronal can, in many respects, be considered to be the default localisation in Old Irish, as discussed in 3.2.1.4.

The distinction between obstruent and sonorant, as detailed in 3.2.1.3, above, is key to Old Irish phonotactics. For this reason, the obstruents of Old Irish are set out first in 3.2.2.1, below, while the sonorants are laid out in 3.2.2.2, and abstract consonants are discussed in 3.2.2.3.

[166] I use this term in the Firthian sense. These symbols are not meant to represent phonemes in the traditional sense, but are rather intended to guide the reader. They are effectively surrogates of the more complex phonological representations given in this chapter. However, for reasons of readability and space, they have been used widely in the discussion of the Old Irish verbal system in chapters 4, 5, and 6.

3.2.2.1. The representation of obstruents

Old Irish obstruents exhibit a three-way contrast in localisation, between labial, coronal, and velar, represented by the percepts {L}, {o}, and {H} respectively on the path of localisation. Specifications on the path of localisation can be either attenuated {L}, {o}, {H}, or intensified {L̲}, {o̲}, {H̲}. An intensified specification on the path of localisation corresponds to closure, while an attenuated specification corresponds to frication, without full closure.

On the path of manner, there is a three-way contrast for obstruents between aspirated, unaspirated, and nasal. These are represented by the percepts {H}, {o}, and {L} respectively on the path of manner. Fortis or aspirated obstruents are represented on the manner path with {H}, lenis or unaspirated obstruents with {o}, and nasal obstruents with {L}. The configurations which occur in Old Irish are laid out in the following table:

Table 28. The obstruents of Old Irish

Path	Aspirated stops			Unaspirated stops			Nasal stops		
Localisation	L̲	o̲	H̲	L̲	o̲	H̲	L̲	o̲	H̲
Manner	H	H	H	o	o	o	L	L	L
Transcription	/p/	/t/	/k/	/b/	/d/	/g/	/m/	/N/	/ŋ/
Path	Aspirated fricatives			Unaspirated fricatives			Nasal fricatives		
Localisation	L	o	H	L	o	H	L		
Manner	H	H	H	o	o	o	L		
Transcription	/φ/	/θ/	/x/	/β/	/ð/	/ɣ/	/µ/		

As can be seen from the table, there are accidental gaps, in that there is a nasal fricative, transcribed /µ/, only with labial localisation.[167] Furthermore, not all of these configurations occur in phrase initial position, as some of them occur initially in the lexical word only as a result of consonant mutation. This is discussed further in section 3.3.1, below.

A further note concerns the aspirated and unaspirated fricatives in the table above. In medial and final position, the spelling of these varies, and it is to be presumed that the contrast between them was not particularly robust. An example is the common

[167] I follow the conventional transcriptional practice in Old Irish of using /µ/ for this configuration. There is no unambiguous IPA symbol for a nasalised bilabial fricative or approximant.

absolute third person singular ending, which is sometimes spelled *-ith* in early Old Irish, e.g. absolute present third person singular *maraith* ‘lasts (Thes.ii p.xxii), but is latter found more often spelled *-id*, e.g. *geilid* ‘grazes’ (Sg143b1). I have generalised the symbols for the aspirated fricatives in the transcriptions in chapters 5 and 6.

Absent from the table above are the sibilant fricative /s/ and the glottal fricative /h/, which require further discussion. These function as obstruents in phonotactic terms, in that sequences of /s/ or /h/ plus a sonorant can occur initially, but in other respects they pattern quite differently. There are no unaspirated or nasal counterparts to /s/ or /h/, in contrast to most the other obstruents presented above. In traditional Irish metrics, canonised in the *IGT*, consonants of the same class, e.g. /p t k/ or /b d g/, were permitted to rhyme (*IGT*i §22f.; Knott 1957), but /s/ stood in a class of its own, being known as the chief, or queen, of the Irish consonants (Molloy 1677: 160; cited by O’Donovan 1845: 416).

The specification of both /s/ and /h/ on the path of manner can be assumed to be {H}, given the similarity of /h/ to the aspiration found with aspirated consonants, which are also specified {H} on the manner path. In later varieties of Irish, after /θ/ had become /h/, the latter consistently merges with an adjacent unaspirated consonant to yield the corresponding aspriated consonant, e.g. *scríobhtha* ‘written’, in prereform orthography, now spelled *scríofa* [sʹkʹriːfa], which is transparently divisible into two morphemes, viz. *scríobh* [sʹkʹriːv-] and the verbal adjective formative *-tha* [-hə].[168] As /s/ becomes /h/ under the lenition mutation (see 3.3.1.2), it seems plausible, in parallel with the sonorants, that /s/ can be considered to have an intensified specification {H̲}, corresponding to high frequency noise, on the path of manner, with /h/ having a corresponding attenuated specification {H}.

As regards the path of localisation, /s/ and /h/ must, on phonotactic grounds, be specified, as they can be followed by sonorants in word-initial clusters, e.g. *snáthath* ‘needle’ (Sg107b3); *sluag* ‘host’ (Sg20b1); *srón* ‘nose’ (Sg95b6); *shnáth* /hna∅θ/ ‘thread’ (TBC 2716) ‘nose, etc. With respect to its effect on chromatic transitions (see 3.1.2.5), /s/ patterns with the coronal obstruents and the sonorants in that the vowel in the constellation /Cʹəs˚/ is sometimes written <i> and sometimes <iu>, e.g. *fis~fius*

[168] See, in a similar vein, the assimilation of a {o} manner specification to {H} in the form *·mitter* in the example at the end of 3.2.1.4.

'knowledge'.[169] However, unlike the coronal obstruents, /s/ has no unaspirated or nasal counterpart, and is not affected by the nasalisation mutation. The solution is to see both /s/ and /h/ as being specified with the percept {ʔ} on the path of localisation.

A further particularity concerns the initial clusters of /s/ plus obstruent. These are immune to lenition (see 3.3.1.4), which suggests that their representation is somewhat particular. Furthermore, as in many languages, there is no contrast between e.g. /sk/ and /sg/, and indeed there is variability as to which such clusters are written with /k/ or /g/ in phonological descriptions of Modern Irish. Different approaches have also been taken in orthographic practice: while Modern Irish uses <sc> in e.g. *scoil* 'school', while Scottish Gaelic uses <sg>, i.e. *sgoil*.

The particularity of such clusters can be captured by claiming that they are characterised by intensified specifications of the paths of both localisation, like the stops, and manner, like /s/. These hyper-intensified configurations are then immune to lenition. The following table gives the representations of /s/, of /h/, and of clusters of /s/ plus obstruent. It should be noted that, given the recent introduction of /p/ in the prehistory of Old Irish, clusters of /s/ plus oral labial stop are largely absent from the Old Irish data, but occur occasionally in Latin loans.

Table 29. Sibilants, /h/, and sibilant stop clusters in Old Irish

Path	Sibilant /s/	/s/ + stop clusters		
Localisation	ʔ	L	o	H
Manner	H	H	H	H
Transcription	/s/	/sp/	/st/	/sk/
Path	Fricative /h/			
Localisation	ʔ			
Manner	H			
Transcription	/h/			

The table above exhausts the phonological representation of obstruents in Old Irish, but it is still necessary to deal with the sonorants, which, given their behaviour with respect to phonotactics, can best berepresented as being specified on the path of manner, but not on that of localisation. Their representation is discussed in the following subsection.

[169] There is no corresponding evidence for /h/.

3.2.2.2. The representation of sonorants

Old Irish distinguishes between what are often termed *fortis* and *lenis* sonorants, upper case /N L R/ being typically used to transcribe the former, and lower case /n l r/ being used for the latter. Members of the fortis series are usually held to be longer and more strongly articulated. In 3.2.1.4, above, it was argued that fortisness is congruent with an intensified specification on the path of manner, while the members of the lenis series have an attenuated specification. This patterning is also consistent with the lenition trajectories of both obstruents and sonorants, as discussed further in 3.3.1, below.

As regards the character of the specification of sonorants on the manner path, a distinction should be drawn between nasal /N n/ on the one hand, and liquid /L R l r/, on the other. The sonorant nasals are held to have the same manner specification as the obstruent nasals discussed in 3.2.2.1, i.e. {L}. The situation with the liquids is not so clear, but it was shown in 3.2.1.4, above, that laterals tend to have high |F3|, while rhotics, on the other hand, tend to exhibit a low |F3|. The formal convention of using lower case characters for the percepts linked |F3| on the path of manner was adopted, in order to differentiate these from the percepts relevant for the identification of the obstruents and the sonorant nasal. The following table lays out the representations of sonorants in Old Irish.

Table 30. Sonorants in Old Irish

Path	Fortis nasal	Fortis lateral	Fortis rhotic
Localisation			
Manner	L	h	l
Transcription	/N/	/L/	/R/
Path	**Lenis nasal**	**Lenis lateral**	**Lenis rhotic**
Localisation			
Manner	L	h	l
Transcription	/n/	/l/	/r/

It should be noted from the table above, that the transcription /N/ for the fortis sonorant nasal is the same as that of the coronal obstruent nasal, even though the phonological representation of the two differs. This is consistent with conventional representational practice in Old Irish and it is to be presumed that the phonetic realisation of the two configurations coincided. However, the coronal obstruent nasal occurs in Old Irish only through the fusion of /n/ and /d/, or as a result of the nasalisation of /d/ (see 3.3.1.4 below). It can be followed by a sonorant word initially (see 3.2.1.4) in contrast to the

fortis sonorant nasal, which cannot be followed by any other consonant in initial position. Instances such as this, where constellations with different phonological representations are neutralised on the surface, have been described as "double agents" in the phonological literature (Gussmann 2002: 186ff.).

This subsection and the previous one have discussed all of the *concrete* consonants which occur in Old Irish, i.e. all of those which have specifications on the localisation and manner paths. The following subsection discusses *abstract* consonants, which are not specified for either localisation or colour.

3.2.2.3. The representation of abstract consonants

A pervasive contrast in colour is a key defining fact of the phonology of the Goidelic languages at all stages of their histories. As discussed in 1.3.1, the academic dispute with respect to Old Irish concentrates on whether three or only two consonant colours contrasted in the language, while researchers working on modern Goidelic languages generally agree that there are only two contrasting colours, the phonetic exponence of which varies somewhat from variety to variety.

The path of colour is obligatory for all cycles in Old Irish phonology and nodes on this path must be specified with one of three possible percepts, i.e. i-colour {H}, a-colour {o}, or u-colour {L}. All of the consonants laid out in 3.2.2.1 and 3.2.2.2, above, thus contrast for the three distinct colours in Old Irish. In reading transcriptions i-colour consonants are transcribed with a following prime, i.e. /C′/, and u-colour consonants with a following degree sign, i.e. /C°/, while the a-colour consonants are written without an accompanying diacritic.

In addition to colour specifications with concrete consonants, such as those laid out in the previous two sections, there is also a class of abstract consonants in Old Irish. While obstruents are specified for localisation, manner, and colour, and sonorants are specified for both manner and colour, abstract consonants are specified for colour, but not for manner or localisation. The symbol /∅/ is used for abstract consonants in reading transcription in this work.

Abstract consonants play a key role in the analysis of Old Irish phonology put forward in this thesis. Firstly, they are key to the representation of initial and final

surface vowels, which are considered to consist of a constellation of abstract consonant plus vowel, and vowel plus abstract consonant, respectively. These are discussed further in 3.2.3.2. Secondly, long vowels and diphthongs in Old Irish are considered here to consist of a vowel plus an abstract consonant, in parallel to many other languages with vertical vowel systems. Long vowels and diphthongs are examined further in 3.2.3.3.

Finally, abstract consonants are held to have particular properties with regard to assimilation, as discussed in 3.3.3.2. These properties are key to representing the difference between different morphological forms. Consonant colour is frequently an exponent of given morphological categories in Old Irish, e.g. u-colour as the exponence of the dative singular of o-stem (and io-stem) nouns (see 3.1.2). In such instances, an abstract consonant is considered to be the formative of this morphological category.

An example of this is the noun *fer* 'man' (already discussed in 3.1.2.1), which is taken to have an underlying form /φ′ər-/. In o-stem nouns, the nominative singular is expressed by the bare stem, i.e. the formative /-/, and the resulting form is *fer* /φ′ər/. The exponence of the genitive singular is i-colour, while that of the dative singular is u-colour. These morphological categories are therefore considered to consist of abstract consonant formatives, /-∅′/ and /-∅˚/ respectively. The morpheme structure of the genitive singular is thus /φ′ər-∅′/, while that of the dative singular is /φ′ər-∅˚/ and after assimilation, the resulting forms are *fir* /φ′ər′/ and *fiur* /φ′ər˚/.

The following table lays out the abstract consonants of Old Irish, alongside examples of concrete consonants, in this case /t/ and /n/, all specified for colour.

Table 31. Consonant colour in Old Irish

Path	i-colour			a-colour			u-colour		
Localisation	o			o			o		
Manner	H	L		H	L		H	L	
Colour	H	H	H	o	o	o	L	L	L
Transcription	/t′/	/n′/	/∅′/	/t/	/n/	/∅/	/t˚/	/n˚/	/∅˚/

The distribution and behaviour of the abstract consonants in Old Irish phonology is discussed further in the relevant sections below, particularly in 3.2.3.2, dealing with initial and final vowels; in 3.2.3.3, covering long vowels and diphthongs; in 3.2.3.4, on the topic of vowels in hiatus; as well as in 3.3.2.3, which discusses abstract consonant excrescence and in 3.3.3.2, which examines assimilation phenomena on the path of colour. This, however, concludes the discussion of the representation of Old Irish

consonants. The next subsection looks rather at the representation of Old Irish vowels, in which the colour path also plays a key role.

3.2.3. Colour and height

This subsection discusses the paths of colour and height. Colour may be understood as a consonantal property, or as one shared between consonant and vowel, whereas height is a purely vocalic property, insofar as the phonological model espoused here recognises consonant and vowel as distinct categories. As discussed above, there is a ternary distinction of colour in Old Irish, with a contrast between i-colour, a-colour, and u-colour, whereas there is a binary distinction in vowel height between the low vowel /a/ and the high-mid vowel /ə/. The low vowel /a/ is considered to be specified by the percept {L} on the path of height, while the high-mid vowel /ə/ is considered to be specified {H} on the same path. The interaction of specifications on the paths of colour and height determine surface vowel quality, which is the primary focus of this subsection.

Surface vowel quality in Old Irish is influenced both by the colour of both preceding and following consonants. Height specifications, defining either of the two vowels, can thus be considered to be in an X_1VX_2 frame, in which both X_1 and X_2 *colour* the vowel. This analysis has much in common with that of a number of other languages with vertical vowel systems, in particular Marshallese (Bender 1968), which has already been discussed in 2.2.6.

In the most straightforward case, both X_1 and X_2 are concrete segments and the vowel between them is short. These cases are analysed in byPrevious studies of Old Irish phonology invariably distinguish between short vowels and long vowels and diphthongs. In this work, long vowels and diphthongs are considered to be combinations of a short vowel plus an abstract consonant, as discussed in 3.2.3.1, below.

Words which begin and end in a vowel on the surface are considered in this work to begin or end in an abstract consonant, which conditions vowel quality in the usual way. For initial surface vowels, X_1 is an initial abstract consonant, and for final vowels X_2 is a final abstract consonant. These cases are examined in 3.2.3.2.

Most existing analyses of Old Irish phonology posit a distinct class of long vowels and diphthongs which can occur only in stressed position. In the current work, these

are seen rather as constellations of short vowel plus abstract consonant. Put otherwise, in the frame X_1VX_2, the first cycle, i.e. that containing X_1 and the vowel, is specified {H} on the path of stress, and X_2 is an abstract consonant. These cases are discussed in subsection 3.2.3.3, below.

As well as short vowels and long vowels, Old Irish exhibits vowels in hiatus. In this framework, these are seen as constellations of vowel, abstract consonant, and vowel. In terms of the XVX frame, vowels in hiatus are understood as having a frame $X_1VX_2VX_3$, where X_2 is an abstract consonant. Vowels in hiatus are discussed in 3.2.3.4.

3.2.3.1. Short vowels

This subsection discusses short vowels in Old Irish. As stated in the introduction, these can be seen in terms of an X_1VX_2 frame in which both X_1 and X_2 are concrete consonants. The following table lays out the short vowels in stressed position which occur in Old Irish, with specifications for the paths of colour and height included, as well as reading transcription, an approximation of the possible phonetic value of the vowels, and the typical orthography.

Table 32. Short vowels in Old Irish

Path	i-colour			a-colour			u-colour		
Colour	H H	H L	o H	o L	L H	L L			
Height	H	H	H	H	H	H			
Transcription	X′əX′	X′əX°	XəX′	XəX°	X°əX′	X°əX°			
Phonetic	[i]	[i~iu]	[ʊi~ə]	[ʊu~ɵ]	[y~ui]	[u]			
Orthography	*i*	*i~iu*	*ai*	*au~u*	*ui*	*u*			
	i-colour			a-colour			u-colour		
Colour	H H	H o	H L	o H	o o	o L	L H	L o	L L
Height	L	L	L	L	L	L	L	L	L
Transcription	X′aX′	X′aX	X′aX°	XaX′	XaX	XaX°	X°aX′	X°aX	X°aX°
Phonetic	[e]	[e]	[e~eu]	[a]	[a]	[a]	[ø~o]	[o]	[o]
Orthography	*ei*	*e*	*eu*	*ai*	*a*	*a*	*oi*	*o*	*o*

As can be seen from the table, there are systematic gaps where {H} height specifications fall before a-colour. This is because of the phenomenon of metaphony,

which automatically lowers all vowels before a-colour, i.e. only /a/ occurs before an a-colour consonant. This is discussed further in 3.3.3.3, below.

The two vowels of Old Irish, /a/ and /ə/, are only in contrast in stressed position and finally before an abstract consonant. In unstressed position, only /ə/ occurs. This is a straightforward case of positional neutralisation. In Old Irish the stress is invariably on the initial syllable of the autosemantic *focal*, as laid out in subsection 1.2.2, above. One of the correlates of stress is increased duration, and unstressed syllables are shorter, often considerably shorter, than stressed vowels. In such a situation, there is unlikely to be time to adjust the formants to a low target /a/, and all vowels are consequently neutralised as /ə/. Final position is cross-linguistically associated with greater length, but even in this position, the contrast is only apparent when the vowels are final on the surface, which means, in terms of the model adopted here, that the word finishes in an abstract rather than concrete consonant, i.e. a consonant with the greatest sonority. Subsequent to the Old Irish period, also the contrast in final position was lost.

This concludes the discussion of vowels flanked by concrete consonants. The next subsection examines initial and final vowels, which are considered to be flanked by a preceding and following abstract consonant respectively, at the edge of a word.

3.2.3.2. Initial and unstressed final vowels

As mentioned above, initial and final vowels are here seen as constellations of abstract consonant plus vowel, or vowel plus abstract consonant, where the abstract consonant occurs at the edge of the word. These can be seen as respectively #∅VX and XV∅# frames. The direct evidence for this analysis in Old Irish comes from verbal reduplication patterns, discussed further in 6.2.2 and 6.3.4, and to a lesser extent from the fusion of prepositions with initial vowels, examined in 4.2.2. Indirect evidence comes from Modern Irish, where this analysis is relatively well established in the phonological literature (i.a. Gussmann 1986; Ní Chiosáin 1991).

In Modern Irish, the orthography distinguishes pairs of initial vowels which are identical on the surface. Thus *uisce* ‘water’ and *ispín* ‘sausage’ both have initial [i~ɪ], while *agallamh* ‘interview’ and *eagla* ‘fear’ both have initial [a]. However, when these nouns are nasalised, as for example after the third person plural possessive *a*, the nasal

consonant differs in colour, e.g. *a* [n]-*uisce* ‘their water’, but *a* [ɲ]-*ispín* ‘their sausage’, and *a* [n]-*agallamh* ‘their interview’, but *a* [ɲ]-*eagla* ‘their fear’. This variation is easiest to explain if one considers the putatively vowel initial word to actually begin with a specification for consonant colour, to which the nasal assimilates. Extending this analysis to Old Irish, initial abstract consonants can be considered to condition following short vowels in exactly the same way as concrete consonants, whose effect on surrounding vowels has been laid out in 3.2.3.1 above.

Abstract consonants are also critical to the representation of unstressed final vowels. Under the phonological model adopted here, no Old Irish lexical word can end in an underlying vowel. As in stressed position, if a form with a final vowel would be expected under the morphology, an abstract consonant whose colour is a copy of that of the preceding consonant repairs the illicit structure (see 3.3.2.3). Final vowels can therefore be seen as combinations of short vowel and abstract consonant.

The following table lays out the unstressed final vowels of Old Irish, with colour and height paths specified and a reading transcription, as well as an approximation of what the phonetic values of each combination might have been, and the typical orthography. It should be noted that this table refers only to unstressed final vowels. Final vowels in monosyllables are also long, and are thus discussed in the next subsection.

Table 33. Unstressed final vowels in Old Irish

Path	i-colour		a-colour		u-colour	
Colour	H H	H L o H	o L	L H	L L	
Height	H	H	H	H	H	
Transcription	X′ə∅′	X′ə∅°	Xə∅′	Xə∅°	X°ə∅′	X°ə∅°
Phonetic	[i]	[u]	[i]	[u]	[i]	[u]
Orthography	*i*	*iu*	*ai*	*u*	*ai*	*u*

	i-colour			a-colour			u-colour		
Colour	H H	H o	H L	o H	o o	o L	L H	L o	L L
Height	L	L	L	L	L	L	L	L	L
Transcription	X′a∅′	X′a∅	X′a∅°	Xa∅′	Xa∅	Xa∅°	X°a∅′	X°a∅	X°a∅°
Phonetic	[e]	[a]	[o]	[e]	[a]	[o]	[e]	[a]	[o]
Orthography	*e*	*ea*	*eo*	*ae*	*a*	*o*	*ae*	*a*	*o*

As can be seen from the table above, in the case of unstressed final vowels, the final abstract consonant is dominant in terms of the conditioning of the the surface vowel

quality. In fact, the surface vowel outcomes are to a considerable degree the inverse of those found in stressed syllables. While the colour of the final abstract consonant is of great importance in distinguishing morphological forms, the orthography does not show any distinction between a-colour and u-colour in the final concrete consonant. At least in terms of orthographic representation, one can observe no difference between combinations of short vowel and abstract consonant after a-colour and the same combinations before u-colour. It can be inferred from this that the a-colour and the u-colour are largely neutralised in this environment. More broadly, one can consider u-colour, to a large extent, a property of the word margins, i.e. initial position and final position, although it also plays an important role in the coda consonant of a syllable with primary stress.

This subsection has discussed the representation of initial and final vowels in Old Irish. In combination with the preceding subsection, this means that all short vowels have been accounted for. The following subsection turns instead to long vowels and diphthongs.

3.2.3.3. Long vowels and dipthongs

In a number of the vertical vowel systems described in chapter 2, surface long vowels and diphthongs are analysed sequences of a short vowel and a glide. This is true of both Northwest Caucasian languages, discussed in 2.2.1, and of Marshallese, covered in 2.2.6, and is also posited for some Central Chadic languages, as seen in 2.2.7. In this work, the same analysis is put forward for Old Irish, where long vowels and diphthongs are considered to consist in combinations of short vowel plus abstract consonant. I believe that this is the first time that such an analysis has been presented for any variety of Goidelic.

The advantages of this analysis are manifold. Firstly, it gives a more consistent and principled analysis of alternations between long and short vowels. Secondly, it simplifies the description of a number of morphological categories, by allowing seemingly diverse alternations in some instances to be expressed by the same formative. Thirdly, it drastically simplifies the analysis of a number of vowel-initial verbal forms which exhibit reduplication.

Alternations between long and short vowels may be found in pronomials, in the nominal system and in the verbal system. The subject pronouns *mé* 'me', *tú* 'you' and *sí* 'she' have long vowels when they appear simply, but the corresponding emphatic forms have short vowels. The alternations are thus *mé* ~ *messe*, *tú* ~ *tussu*, *sí* ~ *sissi*. In order to unify these forms from the perspective of phonological representation, two analytical options present themselves. Firstly, one could posit an underlying long vowel, as found in the simple forms, which is then shortened with the addition of the emphatic suffix. Secondly, one could argue that the short vowel of the emphatic forms is underlying, but that it is lengthened in the simple forms.

The latter analysis is clearly to be preferred in the light of other phenomena in the language, which suggest that the combination of an initial consonant, or consonant cluster, and a short vowel, but no following coda consonant, is not acceptable as a stressed word in Old Irish.[170] Thus, a *fer* 'man' is well-formed, because of the coda consonant, but ***fe* is not a licit stressed word in Old Irish.[171] In instances in which, under the typical operation of the morphology, one might expect a stressed word of only onset and short vowel, a long vowel is found instead.

This minimal word requirement is evident in both the pronominal system, as already mentioned, in certain nominal forms found in the consonantal declensions, and in the verbal system among hiatus verbs and some subjunctives. It is discussed further in 3.3.2.3, but without anticipating the discussion there too much, the repair strategy for illicit word of this nature involves the excrescence of an abstract consonant following the short vowel. The colour of this abstract consonant is a copy of the initial colour of the word.

Further evidence for the analysis of long vowels as combinations of short vowel plus abstract consonant come from hiatus verbs, particularly their present tense forms discussed in 5.1.4. Hiatus verbs have XV- roots, but it is first necessary to look at an example from a verb with an XVX- root. The present third person singular absolute of verbs with XVX- roots has the ending /-əθ′/, while the conjunct generally has final i-

[170] To a large degree, this generalisation holds also for Modern Irish, although there are isolated exceptions, such as *te* 'hot'. However, Sommerfelt (1922a: 133, 1922b: 10ff.) reports that in the dialect of Torr, forms such as this are accompanied by aspiration and a final glottal stop, e.g. *te* [tʲehʔ]. This could be seen as a type of repair mechanism to enforce a minimal CVC template.

[171] While a number of prepositions and preverbal particles do have this structure, e.g. *do*, *ro*, *la, fri* etc., they are *iairmbéarla*, meaning that they cannot occur on their in primary stressed position, as discussed in 1.2.2, and explored in more detail in 4.2.2.

colour as its primary exponent,[172] which can be represented as an i-colour abstract consonant formative /-∅′/ (see 3.2.2.3, above for abstract consonant formatives and 4.3.3.1 for discussion of the person ending in question), to which the final consonant of the present stem assimilates (see also 3.3.3.3). Thus, *canaid* 'sings' has the present stem /kan-/, with absolute present third person singular /kan-əθ′/ /kanəθ′/, spelled *canaid*, and present third person singular conjunct /kan-∅′/ → /kan′/, spelled *·cain*.

Turning to the situation with hiatus verbs, which as stated above can be understood to have XV- roots, one can see that in the present third person singular absolute, they take the same ending as other present tense verbs, e.g. *soid* 'turns'. In the ternary approach to Old Irish consonant colour and vocalism, put forward in this work, the present third person singular conjunct can also be considered to have the same ending as other present tense forms, viz. /-∅′/, thus *soid* has the conjunct present third person singular form *·soí* /sa-∅′/ → /s°a∅′/.

This analysis is not available to the binary approach, in which the operation whereby a broad consonant becomes slender is distinct from that by which a short vowel (in this case binary /o/) becomes a long vowel or diphthong (in this case binary /oi/). That *soid* does not have an underlying diphthong (binary /oi/) is clear from other forms in the paradigm, such as third person singular relative *soas* (Ml123d8). The ternary approach is thus clearly superior in dealing with this type of data, as it is in dealing with the data from the nominal system discussed in 3.1.2, as it drastically simplifies the description of these forms, and relies on a unitary formative rather than a series of morphonological operations.

A third piece of evidence for the analysis of long vowels and diphthongs as combinations of short vowel plus abstract consonant comes from reduplication in certain verbal paradigms, such as the reduplicated future formations discussed in 6.2.2. Reduplication in the future involves reduplicating the first consonant of the subjunctive stem. The reduplicating consonant has i-colour and is followed by schwa, i.e. /C′ə-/. As shown in 3.2.3.2, above, surface initial vowels are considered in this work as constellations of abstract consonant and short vowel. This means that future reduplication of verbs with surface initial vowels can be dealt with in exactly the same

[172] See 4.1.2 for definitions of *absolute* and *conjunct* flexion.

way as those with surface initial consonants. The former reduplicate with /∅′ə-/ in the future. This is discussed further, with relevant examples, in 6.2.2.

The above sources furnish direct evidence for the phonological representation of many of the long vowels and diphthongs found in Old Irish. Others can be inferred on the basis of their orthography and subsequent phonological development. The table below lays out the long vowels and diphthongs of Old Irish, with both colour and height paths labelled, and a reading transcription, approximate phonetic value(s), and typical orthography.

Table 34. The long vowels and diphthongs of Old Irish

Path	i-colour		a-colour		u-colour	
Colour	H H	H L			L H	L L
Height	H	H			H	H
Transcription	X′ə∅′	X′ə∅°			X°ə∅′	X°ə∅°
Phonetic	[iː]	[iˑu]			[uˑi]	[uː]
Orthography	*í*	*íu*			*uí*	*ú*

	i-colour			a-colour			u-colour		
Colour	H H	H o	H L	o H	o o	o L	L H	L o	L L
Height	L	L	L	L	L	L	L	L	L
Transcription	X′a∅′	X′a∅	X′a∅°	Xa∅′	Xa∅	Xa∅°	X°a∅′	X°a∅	X°a∅°
Phonetic	[eː]	[iˑə~eː]	[ɛː~ɛˑu]	[aˑi]	[aː]	[aˑu~oː]	[oˑi~aˑi]	[uˑa~oː]	[ɔː]
Orthography	*é~éi*	*ía~éi*	*é~éu*	*aí*	*á*	*áu*	*oí*	*úa~ó*	*ó*

A first thing to note from the table above is the lack of any evidence for /ə/ after an initial a-colour segment. It should be noted that the configurations /Xa∅′/ and /X°a∅′/ on the one hand, and /Xa∅°/ and /X°a∅°/ on the other, i.e. the vowels represented orthographically by <aí/aé> and <oí/oé>, and by <áu> and <ó>, fall together during the Old Irish period. This can perhaps be considered an early case of neutralisation of the contrast between a-colour and u-colour, and finds parallel in the lack of distinction in the same contexts in the spelling of unstressed final vowels, as discussed 3.2.3.2, above.

The constellation /X′a∅/ is spelled <ía> before an a-colour or u-colour consonant, and <éi> before an i-colour consonant. Alternation between these vowels is a salient feature of many nominal and verbal paradigms, given the relatively high frequency of this configuration. The configuration /X°a∅/ is often spelled as <úa>, although <ó> occurs as well, and following consonant colour does not appear to be a contributing factor to the alternation. The constellation /X′a∅°/ is spelled as <éu/éo> before a u-

colour consonant, as <éui/éoi> before an i-colour consonant, and simply as <é> before an a-colour consonant.

A final note concerns the distribution of long vowels and diphthongs in Old Irish. These occur nearly exclusively under primary stress. In other positions, long vowels and diphthongs are shortened, i.e. they lose their abstract consonant, although there are rare exceptions, such as the agent noun suffix *-óir*, from Latin *-ārius* (*GOI*: §269). When a long vowel or diphthong, which can be represented by the frame XV∅, is followed by a short vowel, two vowels in hiatus occur, as discussed in the next subsection.

3.2.3.4. Vowels in hiatus

As well as short vowels and long vowels, Old Irish exhibits vowels in hiatus. Long vowels and dipthongs can be understood in terms of a frame XV∅, with primary stress, and followed by a consonant or the word boundary. Vowels in hiatus, on the other hand, occur when rather a vowel follows, i.e. in the frame XV∅VX.

Evidence for vowels in hiatus comes from two principal sources. Firstly, some orthorgraphic vowel combinations are clearly indicative of two vowels in hiatus, e.g. combinations of two identical vowels, such as <ii> or <uu>, or two different vowels which are not frequently used to indicate a short vowel, or long vowel or diphthong, e.g. <ue>. Secondly, and more importantly, evidence from early metre can confirm a disyllabic pronunciation of vowels in hiatus. Most Irish metre before the modern period is strictly syllabic, meaning that monosyllabic or disyllabic pronunciations can often be relatively easily inferred.

Two distinct cases must be differentiated with regards to vowels in hiatus. In some cases, a verbal or nominal stem exhibits vowels in hiatus. Examples include the o-stem noun *diall* ‘declension’, the i-stem adjective *deid* ‘idle’, and the strong verbal stems *neat-* and *dieig-*, as in *ar·neat* ‘expects, awaits’ and *con·dieig* ‘asks, seeks’. In these cases, where hiatus is part of the stem, the addition of a morphological formative including a vowel causes syncope of the second syllable. This is discussed further in 3.3.2.1.

In other cases, the stem consists of a single cycle, i.e. it has the shape XV-. In these instances, the addition of a morphological formative beginning with a vowel leads

to two vowels occurring together in hiatus. This occurs occasionally in the nominal system, but is perhaps particularly frequent in the verbal system, where there is a class of hiatus verbs with XV- roots, discussed in 5.1.4. For example, the verb *gniid* 'does, makes' has the root, and present stem, /gʹnʹə-/. When the absolute present third person singular ending /-əθʹ/ is added to this, the result is two vowels in hiatus, i.e. /gʹnʹə-əθʹ/ → /gʹnʹə∅ʹəθʹ/. As can be seen from this example, an excrescent abstract consonant is considered, in this approach, to break up the vowels in hiatus. This is because a cycle must be specified on the path of colour, and the /ə/ of the ending /-əθʹ/ is thus an illicit structure, which is repaired by consonant excresence. This is discussed further in 3.3.2.3.

Unfortunately, the data are insufficient for a full account of hiatus vowels in Old Irish. It is not that it is uncommon to find vowels in hiatus, but rather that while token frequency is relatively high, type frequency is quite low. Forms with hiatus from a few very common hiatus verbs, such as *biid* 'does be' and *gniid* 'does, makes', are found regularly in Old Irish texts, but other constellations are exceedingly rare or in some cases even unattested. That notwithstanding, it is possible to make a few general remarks.

In many cases, vowels in hiatus exhibit the expected values of two short vowels side by side, e.g. *diill* (Sg91b4), the genitive singular of the o-stem noun *diall* 'declension'. In other cases, vowels in hiatus behave more like long vowels and diphthongs. A good example of this is in the a-subjunctive, discussed further in 6.1.2. There is good evidence that a-subjunctive stems involve lowering of a root vowel /ə/ to /a/. Thus the nasal infix (BIV) verb *glenaid* 'sticks' has a root /gʹlʹə-/, to which an /-n-/ is infixed to form the present stem, but the a-subjunctive conjunct first person singular has the form *·gléu* /gʹlʹa∅°/ (Ml86b8), reflecting the subjunctive stem /gʹlʹa-/ and the first person singular formative /-∅°/.[173]

The formatives for the conjunct second and third person singular are /-a∅ʹ/ and /-a∅/ respectively in the a-subjunctive. This is clear from the forms coming from stems ending in a consonant, e.g. second person singular *do·logae*, from *do·lugai* 'forgives', and third person singular *nach·moidea*, from *moídid* 'boasts'. When these are added to

[173] Note also with respect to lowering in the a-subjunctive stem the first person singular forms *at·cheur* from *ad·cí* 'sees', and *ro·cloor* from *ro·cluinethar* 'hears', as well as the second person singular form *do·logae*, from *do·lugai* 'forgives', all discussed in 6.1.2.

stems ending in a vowel, the results are spelled <ie> and <ia> respectively, e.g. second person singular *ní·crie*, from *crenaid* 'buys', and third person singular *as·ria*, from *as·ren* 'pays out, expends'.

On the face of it, these forms are irregular, suggesting a high rather than low first vowel. However, as shown in 3.2.3.3, above, this is exactly the same result as one finds in long vowels of the shape /X′a∅/, which are spelled <ía> before an a-colour or u-colour consonant. The conclusion must be that the a-subjunctive forms discussed above similarly reflect the constellation /X′a∅V/[174] with the same result as among long vowels, the only difference being that while the abstract consonant composing the long vowel is followed by a consonant or word boundary, that of vowels in hiatus is followed rather by a vowel.

This concludes the discussion of vowels in hiatus, although further notes as to their representation are given in 3.3.2.1, dealing with syncope, and 3.3.2.3, which examines abstract consonant excrescence.

The previous subsections have laid out the phonological model underpinning this work and the representations assumed for an adequate description of the phonology of Old Irish. The representations given in the subsections above are static, although allusion has been made to various phonological phenomena at work in the language in order to justify them. The following section focuses instead on dynamic phenomena. Combining the representations above and the phenomena discussed below lays the groundwork for the description of the Old Irish verbal system laid out in chapters 4, 5, and 6.

3.3. Phonological phenomena in Old Irish

This section discusses the most important phonological phenomena in Old Irish. Subection 3.3.1 discusses consonant mutation, which although not strictly speaking a synchronic phonological phenomenon, is expressed through the manipulation of phonological categories, and is critical to the workings of Old Irish grammar. Subsection 3.3.2 deals with the related questions of syncope and epenthesis, which are key phenomena

[174] Evidence for the constellation /X°a∅V/ is considerably more limited and often ambiguous.

for the description of Old Irish morphology, as the addition of formatives to a stem induce often considerable reorganisation of phonological material. Subsection 3.3.3 discusses various phenomena of assimilation, especially assimilation of colour, which bears directly on the main theme of this thesis.

3.3.1. Consonant mutation

One feature shared by all the Insular Celtic languages is the phenomenon of initial consonant mutation. Mutation involves an alternation in the initial consonant of a word that is not predictable from phonological context, but relies rather on morphological or syntactic triggers. Consonant mutation is clearly not a phonological phenomenon in the strict sense, but its domain of operation is the phonological system, and it is inevitable that alternating consonants be viewed as related in some fundamental way.

The phonological framework laid out in subsection 3.2.1 is based on the way in which the sounds of a language might be perceived and modelled by speakers of that language, and it seems inevitable that the alternations involved in consonant mutation would have been very much part of the way in which speakers of Old Irish understood their phonological system. For this reason alone, it merits description here. Subsection 3.3.1.1 gives an overview of consonant mutation in Irish and other languages, while 3.3.1.2 looks at various approaches to consonant mutation as a grammatical phenomenon. Subsection 3.3.1.3 discusses the terminological difficulties surrounding consonant mutation in Irish, and in Old Irish in particular, while subsection 3.3.1.4 lays out the mutation trajectories found in Old Irish and their phonological representation in the current work.

3.3.1.1. Consonant mutation in Irish and other languages

Terminological considerations with respect to consonant mutation in Old Irish are discussed further in 3.3.1.3, but some preliminaries are necessary at this point. Consonant mutation can be considered a grammatical phenomenon which has a *trigger*, causing the mutation, and a *target*, which is mutated. Often the trigger is an overt synsemantic

word, but sometimes it is rather a morphological or syntactic category. The target is a following word, whose initial consonant or vowel is mutated. An unmutated consonant is known as the *radical*, while one can speak of the mutation *trajectory* as the passage from the radical to its outcome under a certain mutation *grade*.

An example of consonant mutation in Modern Irish is given below. The target words are *cara* 'friend' and *athair* 'father', while the trigger is the third person possessive. This is *a* for each of the third person singular masculine, the third person singular feminine, and the third person plural, but there is a difference in the grade of mutation triggered in each instance. For the third person singular masculine, lenition is triggered, represented by superscript /^{L}/ after the trigger; in the third person singular feminine, h-affixation is triggered, represented with /^{H}/; and in the third person plural nasalisation is triggered, represented with /^{N}/. The examples are chosen because one begins with a vowel and one with a consonant, and the outcomes are different in each case.

(3)	a.	*cara* → *a chara*	/ə^{L} + karə/	→ /ə xarə/	'his friend'
	b.	*athair* → *a athair*	/ə^{L} + ahər′/	→ /ə ahər′/	'his father'
(4)	a.	*cara* → *a cara*	/ə^{H} + karə/	→ /ə karə/	'her friend'
	b.	*athair* → *a hathair*	/ə^{H} + ahər′/	→ /ə hahər′/	'her father'
(5)	a.	*cara* → *a gcara*	/ə^{N} + karə/	→ /ə garə/	'their friend'
	b.	*athair* → *a n-athair*	/ə^{N} + ahər′/	→ /ə nahər′/	'their father'

Initial consonant mutation has a relatively high degree of penetration in the Insular Celtic languages, being present in 18% of words in a large corpus of written Modern Irish (Welby et al. 2011: 2122). It has a wide range of grammatical functions, including giving information about gender, number and case in nouns and tense, modality and polarity in verbs. In most instances, there is an overt preceding morpheme, which is said to cause the mutation. However, this is not always the case, at least in Modern Irish, where consonant initial past tense forms are lenited without the overt presence of a preceding trigger, e.g. MIr. *chuir* 'put-PAST'. These cases are sometimes known as incorporated mutation (Oftedal 1962; Ternes 1990: 12).

Comparisons of the Insular Celtic mutations with similar phenomena elsewhere have been carried out by Martinet (1952) for Western Romance, D. Kelly (1978) for Southern Paiute, Oftedal (1982) for the Spanish of Gran Canaria, and Ternes (1990) for

West African languages. The most thorough typological study of which I am aware is Iosad (2008), who examines a wide range of languages which exhibit initial consonant mutation or similar phenomena. He distinguishes between endocentric alternations, which can be described solely by reference to the word with which they are associated, and exocentric alternations, which cannot be described without reference to factors outside the word. He claims that the latter are quite rare: "it is only the Celtic mutations (though they present several distinct types), Nias, Nivkh, and Mundurukú that undoubtedly present a case of endocentric initial consonant mutation (depending on the interpretation, the dialects of Italy and Fula may also be part of this group)" (Iosad 2008: 129). This leads directly to questions about the grammatical analysis of the phenomenon, which is the topic of the next subsection.

3.3.1.2. Phonology or morphology?

Some recent accounts of mutation treat it as a purely morphological phenomenon. In Green (2006: 1977-82), for example, it is argued that both radical and mutated versions of each word are stored individually in the lexicon. In this view, the choice between e.g. [karə~xarə~garə] in the example in 3.3.1.1 above is one made entirely by morphological considerations, without any reference to phonology. This approach is compatible with views of lexical representation whereby different morphological forms are independently represented in lexical storage, rather than being derived by rule from a radical form (e.g. Bybee 2001: 20-21). Stewart (2004) provides a fully morphological analysis of initial consonant mutation in Scottish Gaelic.

Another view considers phenomena such as initial consonant mutation to be phonological. This seems implicit in Sapir's analysis of similar phenomena in Southern Paiute (1930; 1933). Southern Paiute, like other languages belonging to the Numic branch of Uto-Aztecan, has a series of consonant alternations, triggered by a preceding word, that closely resemble the mutations of Insular Celtic. Sapir's solution was to analyse the trigger words as ending in an abstract phoneme which does not generally surface, but which spirantises, nasalises or geminates the initial of the following word (Sapir 1930: 63). In subsequent scholarship in Numic phonology this abstract phoneme came to be known as a final feature (e.g. Miller 1982).

A similar position to Sapir is taken by Chomsky and Halle, who explicitly draw on his work in order to argue in favour of two levels of phonological structure: a systematic phonemic level and a systematic phonetic level (Chomsky and Halle 1965: 98; Chomsky and Halle 1968: 11; contra Ladd 2011; Pierrehumbert 1990). They further draw on Sapir's analysis of Southern Paiute to support their arguments for ordered derivational rules, whereby a surface or phonetic level is derived from an underlying one (SPE 345-9). This is incompatible with the theoretical model adopted here, which operates on the assumption that the phonological description of the language user has only one level (J. Harris 1996: 307).

Regardless of the actual theoretical stance however, a purely phonological analysis of the Insular Celtic consonant mutation is fraught with difficulties. Firstly, the mutations occur independently of phonological context (Cyran 2003: 46). As can be seen in the example above, three different outcomes (no mutation, lenition and nasalisation) occur in the same phonetic environment, i.e. after unstressed schwa. Secondly, both lenition and nasalisation affect different consonant classes in Irish in different ways, making a purely phonological explanation potentially problematic. Thirdly, a large number of exceptions, irregularities and mixing of different grades of mutation within the same paradigm can be observed in the Insular Celtic languages (Green 2006: 1958-76).

Although the Insular Celtic mutations are not purely phonological, there are also a number of difficulties involved in considering them to be purely morphological. Firstly, if radical, lenited, and nasalised tokens are all found in lexical storage, speakers should not be able to mutate new words correctly, whereas in reality this should be little different than, for example, choosing the correct plural suffix for a newly learned English word. A response to this is that listeners generalise tendencies as they categorise new lexical items (Bybee 2001: 22), but for a phenomenon such as initial mutation this is already to admit that listeners develop schemata of the different mutations, undermining the case for an analysis of mutation based purely in morphology.

A second objection to the morphological approach is that they result from truly phonological alternations that occurred in the prehistory of Irish, which have tended to recur. One example of this is nasalisation in the Lewis dialect of Scottish Gaelic (Oftedal 1956), while another is spirantisation in Manx (Broderick 1986: 3-13;

Macaulay 1992: 129; Green 2006: 1953-4). It is true that these phenomena may be considered "natural processes" in the sense understood in Natural Phonology (e.g. Donegan and Stampe 2009), but the fact that it is these particular natural processes, and not any number of others, that tend to recur suggests that the phonological patterning of the Goidelic languages both supports mutation and is reinforced by it.

Furthermore, under lenition a radical stop surfaces as a fricative in Old Irish, but there are cases where two adjacent fricatives are realised as a stop (see 3.2.1.4). A phonological phenomenon of this nature militates against attempts to describe mutation as an entirely morphological phenomenon, independent of phonological patterning in the language, as the relevant alternation is bidirectional at the phonological level. Another phenomenon of relevance in this context is reradicalisation (Cyran 2003: 71), whereby the initial consonant of a word is reinterpreted as beginning with a different consonant which participates in a shared mutation paradigm, e.g. alternation of /b/ and /m/ in Modern Irish *beach~meach* 'bee' (Wagner 1959c; Hamp 1971; Gleasure 1973; D. Kelly 1978: 82-7; Chudak 2012).

It was the view of the earliest structuralists (e.g. Kruszewski 1881) that alternations occurring in different morphological forms are critical to understanding the workings of sound systems more broadly. This point is shared by the phonologists of the Moscow school (e.g. Reformatsky 1970: 402-9) and is reprised by Gussmann (2002: 89). Mutation in this view is a "morphonological" phenomenon, as Hamp already claimed in 1951. Cyran (2003: 68) defines morphonology as covering "cases of petrification of phonological regularities when the phonological system itself develops in such a way that the pattern can no longer be phonological". This seems to capture the situation with regard to the Goidelic mutations very closely. It does not, however, solve the terminological problems inherent in discussons of consonant mutation in these languages. This is the subject of the next subsection.

3.3.1.3. Problems of terminology

A brief discussion of the terminology used to describe mutation is warranted here, in order to disambiguate the phenomenon itself. One issue is that consonant mutation affects different classes of segments in different ways. Lenition and nasalisation are

unitary phenomena from the phonological point of view, but are diverse in terms the phonetic alternations they involve (Swingle 1993: 452). Under lenition, the oral stops and /m/ are realised as fricatives, /φ/ surfaces as an abstract consonant, /s/ as /h/, and the fortis sonorants /N L R/ as their lenis counterparts /n l r/. From a phonetic perspective, these changes must be regarded as quite distinct: spirantisation in the case of the stops and /m/, deletion of /φ/, debuccalisation in the case of /s/, and laxing or lenition in the case of the sonorants. Under nasalisation, the aspirated obstruents /p t k φ/ surface as their unaspirated counterparts /b d g β/, while the unaspirated ones /b d g/ are realised as nasals /m N ŋ/, changes which would be categorised as deaspiration and nasalisation respectively from a phonetic perspective.

These facts lead to terminological difficulties in the description of the phenomena at hand, in that the phonetic alternations that occur in lenition and nasalisation do not always correspond to what is understood by *lenition* and *nasalisation* in the phonetic literature. For example, the change of /p t k φ/ to /b d g β/ under nasalisation does not involve any phonetic nasalisation whatsoever. The retention of the conventional term in this work is justified however, by the phonological representation of the phenomenon.

The problem with the term *lenition* is perhaps even more acute, as it is a frequently used term in the phonological literature to describe cases where a consonant changes to what is considered a weaker phonetic form. Although this is accurate in the case of Old Irish, and indeed underlies the phonological representation of this phenomenon given here, from a phonetic point of view, the phonetic term *lenition* covers a broader range of phenomena than those which occur under the lenition mutation, including, for example, the deaspiration of the fortis stops under nasalisation.

However, many of the alternative terms have their own difficulties. The native Irish term, *séimhiú* , literally means ‘thinning, lessening, attentuating’ (DIL S148) and is thus potentially confusing given the fact that the word *caol*, meaning ‘slender’, is used to describe consonant colour. A term used in many late nineteenth century and early twentieth century grammars (e.g. Windisch 1879; Pedersen 1897; Vendryes 1908) is “aspiration”, but this is even more misleading, as none of the alternations involved in lenition correspond to aspiration as it is understood in the contemporary phonetic and phonological literature.

Adoption of the Welsh term *soft mutation* would be a possible solution to this problem and there is some precedence for this usage in the term *bogadh* 'softening' in the native grammatical tradition (AnaÉ 1265-75). However, in later works of traditional grammar the terms *bog* 'soft' and *cruaidh* 'hard' are used to describe aspirated and unaspirated consonants respectively (*IGT* 1: iv).[175] The solution adopted here to negotiate this terminological minefield is to simply maintain the terms *lenition* and *nasalisation* for the morphonological mutation phenomena observed in Irish, in spite of the potential issues. The following subsection discusses the mutations found in Old Irish and outlines the representational conventions adopted for them in this work.

3.3.1.4. Consonant mutation in Old Irish

In Old Irish, there are three grades of mutation. The most common is lenition, represented in this work with /^{L}/ following its trigger, which affects all consonants which can occur in initial position, by changing an intensified localisation or manner specification into an attenuated one. Nasalisation, represented here with /^{N}/ following the trigger, has visible effects only on oral obstruents. It is disputed whether gemination, represented here with /^{G}/ following the trigger, existed in Old Irish at all.

As mentioned above, the initial consonant of a word not affected by mutation can be termed the *radical* consonant. Only a subset of the consonants laid out in subsection 3.2.2, above, can occur as radical consonants in Old Irish. These consonants include the six oral stops /p b t d k g/, the labial nasal stop /m/, the fricative /φ/, the sibilant /s/, and the fortis sonorants /N L R/, as well as the abstract consonant /∅/. With the exception of /φ/ and /∅/ all of these consonants are characterised by an intensified specification of on either the path of localisation (in the case of the obstruents) or of manner (in the case of the sonorants).

In the framework adopted here, the lenition of these radical consonants involves the attenuation of these intensified localisation and manner specifications. In the case of /φ/, where the localisation and manner specifications are attenuated to begin with, both

[175] Interestingly, the same perceptual metaphor of soft and hard is used with a completely inverse meaning in German, where *hard* consonants are typically aspirated, as in the term *Auslautverhärtung* 'word-final hardening' for final obstruent devoicing.

are rather deleted instead. In the case of /∅/, which does not have any specifications on the paths of localisation or manner, there is no change under lenition. As discussed in 3.2.2.1, clusters of /s/ plus stop are considered to have intensified specifications on the paths of both localisation and manner, and are immune to lenition. The lenition trajectories which occur in Old Irish are laid out in the following table, with both phonological representations and reading transcriptions.

Table 35. Lenition in Old Irish

aspirated stop → aspirated fricative									
Localisation	L	→	L	o	→	o	H	→	H
Manner	H		H	H		H	H		H
Transcription	/p/		/φ/	/t/		/θ/	/k/		/x/
unaspirated stop → unaspirated fricative									
Localisation	L	→	L	o	→	o	H	→	H
Manner	o		o	o		o	o		o
Transcription	/b/		/β/	/d/		/ð/	/g/		/ɣ/
nasal stop → nasal fricative; /s/ → /h/; /φ/ → /∅/									
Localisation	L	→	L	ʔ		ʔ	L	→	
Manner	L		L	H	→	H	H	→	
Transcription	/m/		/μ/	/s/		/h/	/φ/		/∅/
fortis sonorant → lenis sonorant									
Localisation									
Manner	L	→	L	h	→	h	l	→	l
Transcription	/N/		/n/	/L/		/l/	/R/		/r/

The second mutation grade of importance in Old Irish is nasalisation. In contrast to lenition, which affects all possible radical consonants, nasalisation has visible effects only on the oral stops and the fricative /φ/. This distribution can be understood if nasalisation is considered to only target attenuated specifications on the manner path, in contrast to lenition, which targets rather fortis specifications on the localisation and manner paths indiscriminately. More specifically, nasalisation involves the addition of a low {L} specification to the manner path.

This has the effect of transforming an existing {H} into {o}, and an existing {o} into {L}, in line with the ternary scales (Gnanadesikan 1997) discussed in 3.2.1.4. In the case of /s/ and the fortis sonorants /N L R/, which have intensified manner specifications, the addition of an {L} specification has no effect. In the case of /m/, which has a low {L} specification on the manner path to begin with, nasalisation can be considered

to apply vacuously, as the addition of an {L} specification to an existing {L} specification prompts no observable change. The following table outlines the changes inherent in nasalisation in Old Irish. As nasalisation does not apply to them, /s/ and the fortis sonorants are omitted from consideration.

Table 36. Nasalisation in Old Irish

					/p/ → /b/ → /m/					
Localisation			L		L			L		L
Manner	L	+	H	→	o	L	+	o	→	L
Transcription			/p/		/b/			/b/		/m/
					/t/ → /d/ → /N/					
Localisation			o		o			o		o
Manner	L	+	H	→	o	L	+	o	→	L
Transcription			/t/		/d/			/d/		/N/
					/k/ → /g/ → /ŋ/					
Localisation			H		H			H		H
Manner	L	+	H	→	o	L	+	o	→	L
Transcription			/k/		/g/			/g/		/ŋ/
					/m/ → /m/; /φ/ → /β/					
Localisation			L		L			L		L
Manner	L	+	L	→	L	L	+	H	→	o
Transcription			/m/		/m/			/φ/		/β/

Under nasalisation, two nasal stop configurations, i.e. /N/ and /ŋ/, emerge which are not found in radical position. Clusters of nasal sonorant and homorganic lenis stop in Old Irish are neutralised to the homorganic nasal stop. Thus, there is constant fluctuation also in the orgthography between e.g. <mb> and <mm>, and <nd> and <nn>. In this particular context, nasalisation can be viewed as involving the addition of /n/, and the assimilation is automatic.

To a large degree, this also works for combinations of nasal plus fortis stop, as these are neutralised to lenis stops in verbal derivation, e.g. in certain forms of the t-preterite discussed in 6.3.2, below. To a much greater degree than lenition, therefore, nasalisation can be represented by the simple addition of a segment. This is also evident before vowels, where nasalisation entails the addition of a preceding /n/, as can be seen also in Modern Irish, in the example at the beginning of 3.3.3.1, above.

The traditional grammars describe one further mutation grade in Old Irish, namely gemination. Although Thurneysen (*GOI*: §240) and Lewis and Pedersen (1937:

123ff.) consider the distinction between singleton and geminate consonants to be distinctive in the language, Pokorny (1913: 34) is more circumspect, suggesting that it might just be an artefact of orthographic practice, a position also taken by Vendryes (1908: 36). By and large, however, the idea of contrastive gemination persisted throughout the first half of the twentieth century (i.a. Hamp 1951; Jackson 1953). It was explicitly challenged by Greene (1956), who argued that Old Irish distinguished only between unlenited and lenited consonants, and that gemination did not occur. He later extended this hypothesis to Insular Celtic as a whole (Greene 1966).

The most thorough treatment of the question is to be found in Feuth (1983). She reviews the existing literature and compiles an inventory of orthographically geminated forms in the Würzburg, Milan, and St. Gall glosses. She concludes that the occurrence of orthographic gemination is not random, but appears to be systematic, concluding that gemination was indeed a productive mutation pattern in Old Irish. Harvey (1987) examines the orthography of consonant gemination in Ogham Irish, as mentioned in subsection 3.1.1, above.

Whether or not consonants were phonetically geminate in the contexts laid out by Thurneysen (*GOI*: §241-244), it is clear from Feuth's study that gemination was the elsewhere case, where there was an *iairmbéarla* but "no mutation marker of lenition or nasalization had been attached" (Feuth 1983: 152). This means that although gemination might have occurred, it did not contrast with singleton unlenited consonants. Before an abstract consonant, the geminate mutation persists into Modern Irish, where it prefixes /h/ to vowels. This was doubtless also the case in Old Irish, and can be seen as parallel to nasalisation, although in this case involving the addition of a {H} specification on the manner path, whereas nasalisation involves an {L} specification. The whole question of gemination requires further research, also in the context of the Brythonic evidence.

The above subsection has outlined the phenomena of consonant mutation found in Old Irish and given phonological representations for the alternations they involve. The subsequent subsections examine more clearly phonological phenomena: syncope and epenthesis in 3.3.2, and then various assimilatory phenomena in 3.3.3.

3.3.2. Syncope and epenthesis

Two interacting phenomena of great importance in Old Irish phonology are syncope and epenthesis. Syncope regularly deletes every second unstressed, non-final vowel. There are two phenomena that fall under the rubric of epenthesis. Vowel epenthesis entails the regular appearance of a vowel to break up illicit conosonant clusters. Consonant epenthesis, or excrescence, involves the appearance of an abstract consonant at the end of a monosyllabic form consisting of a consonant or consonant cluster and a short vowel. In what follows, the term *epenthesis* is used solely for the first of these phenomena, whereas the second is discussed under the rubric of *excrescence*. Syncope is examined first, in 3.3.2.1, below, followed by a discussion of epenthesis in 3.3.2.2, and then of consonant excrescence in 3.3.2.3.

3.3.2.1. Stress, syncope, and epenthesis in Old Irish

In Old Irish, syncope deletes every second unstressed, non-final syllable in a word. This is most evident in nominal and verbal derivation, where the addition of a derivational or inflexional suffix extends the syllable count of a word, thus bringing certain syllables into a position in which they are vulnerable to syncope. In the representational framework adopted here, syncope is seen in terms of the deletion of ephemeral vowels, represented {L} on the path of stress, as laid out in 3.2.1.4.

This phenomenon is found frequently in the both the nominal and verbal systems, but can be illustrated with an example from the nominal system. In the consonant declensions (*GOI*: §315-39), oblique cases are characterised by a particular stem consonant, sometimes followed by a further vowel, which is absent in the nominative singular. Thus, for example, the feminine noun *cathir* /kaθərʹ/ ‘town’ exhibits a velar fricative in the oblique cases, e.g. genitive singular *cathrach* /kaθrax/, and accusative plural *cathracha* /kaθraxa∅/.

As can be seen from these examples, the second vowel of *cathir* surfaces in the nominative singular, where no syllable follows, but is absent in the genitive singular and accusative plural, which contain a formative containing the stem consonant, as well as a further vowel in the latter case. The presence of this formative means the second

vowel in cathair falls in a position in which it is vulnerable to syncope, i.e. as an non-final, unstressed vowel in an even syllable counting from the beginning of the word. This vowel is thus deleted under syncope.

In terms of phonological representation, stress is dealt with here as a path on par with height, colour, manner, and localisation. As laid out in 3.1.2.4, stress assignment in underlying forms in Old Irish is automatic: the first stress specification is high {H}, and all subsequent even specifications, i.e. in the second cycle, the fourth, etc. are ephemeral and liable to syncope, thus being specified {L}, while all subsequent odd specifications, i.e. in the third cycle, the fifth etc., are unstressed but not vulnerable to syncope, thus being specified {o}.[176] The final stress specification of a word is always {ʔ}, indicating the word boundary, while the penultimate one is never ephemeral, only ever unstressed, or in the case of a monosyllable, fully stressed.

The following table shows full phonological representations for *cathir* 'town'[177] as well as its genitive singular and accusative plural forms, *cathrach* and *cathracha* respectively. Specifications which alter over the course of the derivation are shown in bold, while those which are deleted are placed in parentheses.

Table 37. Derivation of *cathir* 'town', gen. sg. *cathrach*, acc. pl. *cathracha*

	cathir /kaθər′/																					
Localisation	H			o							H			o								
Manner	H			H			l				H			H			l					
Colour	o			o			H		→		o			o			H					
Height			L			H							L			H				ʔ		
Stress			H			**L**							H			o				ʔ		
Transcription	k		a		θ		ə		r′		→					/kaθər′/						
	cathrach, /kaθər′-əx/ → /kaθrax/																					
Localisation	H			o					H				H			o			H			
Manner	H			H			l		H				H			Hl			H			
Colour	o			o			(H)		o		→		o			o			o			
Height			L			(H)			**H**						L			L			ʔ	
Stress			H			(L)			o						H			o			ʔ	

[176] A number of synsemantic formatives cannot have an {L} specification and are inherently specified as unstressed {o}, rather than ephemeral {L}. This includes proclitic *iairmbéarla* elements (see 1.2.2), and at least one derivational suffix, *-ig*, as discussed in 4.2.1. In the case of the latter, the stress assignment restarts from the suffix, thus it itself has the specification {o}, but the following specification is ephemeral {L}, making it vulnerable to syncope.

[177] An alternative representation, in which cathir is considered monosyllabic /kaθr′/, the final cluster being then split by epenthesis, seems problematic, given the differing colour of the two elements of the cluster.

Transcription	k	a	θ	ə	r′	-ə	x	→	/kaθrax/				
	cathracha, /kaθər′-əxə/ → /kaθraxa∅/												
Localisation	H		o			H			H	o	H		
Manner	H		H		l		H		H		Hl	H	
Colour	o		o		(H)		o	→	o		o		o
Height		L		(H)		**H**		**H**		L		L		L	ʔ
Stress		H		(L)		o		**L**		H		o		o	ʔ
Transcription	k	a	θ	ə	r′	-ə	x	ə	→	/kaθraxa∅/			

In the table above, the first example shows *cathir* alone. It is presumed that the second syllable is inherently unstressed, but syncope fails to apply, as this syllable is final, and the underlying {L} specification is raised to {o} before final {ʔ} on the same path.

The second example shows the derivation of genitive singular *cathrach*. The the genitive singular formative /-əx/ causes the second syllable of *cathir* to fall into a position where it is liable to syncope, and thus the {L} stress specification and the corresponding height specification are deleted under syncope. The corresponding cluster is shown with a complex {Hl} specification on the manner path, and as colour assimilation under syncope is progressive in Old Irish (see 3.3.3.2, below), the cluster retains the colour of the first element. High vowels before a-colour are lowered according to the principle of metaphony laid out in 3.3.3.3, below. Formally, this entails the lowering of height specifications from {H} to {L} before a following {o} on the colour path.

The third example in the table above shows accusative plural *cathracha*. The changes which apply to *cathair* and *cathrach* also apply to *cathracha*, but a number of additional points should be mentioned. Firstly, the first height specification of the accusative plural formative /-əxə/ is not liable to syncope, as it is an odd syllable considering the word as a whole. Secondly, although I have assumed that the formative is minimally specified, without a final consonant, the phonology of the language requires that the word end with a consonant, so a final abstract consonant appears, having the same colour as the preceding specification on the same path. This phenomenon is discussed further in the subsection on consonant excrescence, 3.3.2.3, below.

Syncope applies also to vowels in hiatus. For example, the o-stem noun *diall* ‘declension’ is well attested in the St. Gall glosses, e.g. nom. sg. *diall* (i.a. Sg27a14). That it has vowels in hiatus is clear from the spelling of gen. sg. *diil* (i.a. Sg91b4). When it occurs with an ending with a vowel, the hiatus disappears and a form with a long vowel results instead, e.g. dat. du. *díllib* (Sg106b17). To account for this variation,

it is reasonable to assume an underlying form /dʹəØʹəl/, with vowels in hiatus. The genitive singular and dative singular forms are formed with abstract consonant formatives (see 3.2.3, below), thus gen. sg. /dʹəØʹəl-Øʹ/ → /dʹəØʹəl-Øʹ/ *diil*, and dat. sg. /dʹəØʹəl-Ø°/ → /dʹəØʹəl°/ *diull* (i.a. Sg27a7). The dative dual, on the other hand, has a formative with a vowel, /-əβʹ/. When this is added, the second vowel of the stem falls into a position vulnerable to syncope, thus /dʹəØʹəl-əβʹ/ → /dʹəØʹləβʹ/ *díllib*.

There are, however, examples in which when the second of two vowels in hiatus is deleted through syncope, the preceding abstract consonant specification is lost as well. This is discussed where it occurs in the exposition of Old Irish verbal morphology in chapters 5 and 6, but it should be noted that it seems especially common for the constellation of an i-colour consonant, a vowel, and an a-colour abstract consonant, i.e. /XʹVØ/ (see *GOI*: §106).

This concludes the discussion of syncope in Old Irish. Many further examples can be adduced from chapters 5 and 6, however. The following subsections examine vowel epenthesis, in 3.3.2.2, below, and consonant excrescence, in 3.3.2.3.

3.3.2.2. Repair of illicit structures: vowel epenthesis

Interacting with syncope are a set of phenomena that up until now have been referred to as *epenthesis* in this work. However, two main classes of epenthetic phenomena are apparent in Old Irish. Firstly, vowel epenthesis consists in the insertion of an anaptyctic or svarabhakti vowel, /ə/, to break up illicit consonant clusters, i.e. **CC → CəC. Secondly, an epenthetic abstract consonant, /Ø/, is inserted between two adjacent vowels, or after a final vowel at the end of the word, i.e. **VV → VØV, or **V# → VØ#. In what follows, the first of these phenomena is referred to simply as *epenthesis*, while the second is termed *excrescence*. Epenthesis is discussed in the current subsection, while subsection 3.3.2.3 deals with excrescence.

McCone (1987: 6) describes epenthesis as occurring before /n l r/ when these fall between two consonants, or when they appear in word final position after a consonant. A number of exceptions are laid out by Thurneysen (*GOI*: §111-112), but by and large this formulation captures the phenomenon. The generalisation is that a TR-cluster

is illicit unless there is a following vowel, illicit clusters being broken up by epenthetic /ə/. In practice this entails the operations **VTRT → VTəRT and **VTR# → VTəR.

A number of caveats and clarifications need to be made to qualify this generalisation. Firstly, Thurneysen's generalisation of the epenthesis rule to nasals is inaccurate. The bilabial nasal /m/ functions in all respects as a stop in Old Irish, and final clusters of sonorant plus /m/, i.e. /rm lm nm/, are perfectly licit in the language, e.g. *form* 'on-me', *salm* 'psalm', and *ainm* 'name'. Secondly, the distinction laid out in 3.2.1.4 between the coronal nasal obstruent and the nasal sonorant must be kept in mind. While a final cluster of sonorant plus a coronal nasal sonorant, e.g. /rn/ would indeed be illicit, a final cluster of coronal plus coronal nasal obstruent, e.g. /rN/ is not. Thus *iarn* 'iron' has final /rN/, not final /rn/, as later spellings in <rnn> and <rnd> attestify. This example in turn introduces a third caveat: clusters of nasal and homorganic lenis stop can occur even after a following consonant. This is because such clusters are neutralised to the corresponding nasal obstruent, as mentioned in the discussion of nasalisation in 3.3.1.4, above, and explored further in the subsection on manner assimilation 3.3.3.1, below.

The interaction of the phenomena of syncope and epenthesis can be usefully illustrated with the verb *comalnaithir* 'fulfils'. This is a weak deponent verb, and alongside other such verbs is discussed further in 5.2.1. It is formed from the compound noun *comlán* 'perfect', which to simplify the exposition below has been considered monomorphemic, although splitting it into two separate morphemes has no impact on the derivation.

Table 38. Syncope and epenthesis: *comalnaithir* 'fulfils'

	comalnaithir /k°aμla∅n-əθ′r′/ → /k°aμalnəθ′ər′/																			
Localisation	H		L			o			H		L			o						
Manner	H		**Lh**		**L**		**Hl**		H		L		hL		H		l			
Colour	L		o		(oo)		H	→	L		o		o		H		H			
Height		L		(L)		H				L		H		H		H		ʔ		
Stress		H		(L)		o				H		o		o		o		ʔ		
Transcription	k°	a	μl	a	∅n	-ə	θ′r′	→					/k°aμalnəθ′ər′/							

The first syllable, being fully stressed, is identical in both the input and output of the derivation, but the rest of the word, as can be seen in the table, is radically restructured. The vowel of /-la∅n-/, falling as it does in the second syllable of a word of three syllables or more, is lost through syncope, this entailing loss of the the stress and height

specifications. The following colour specifications (including that of the abstract consonant representing vowel length) are also lost through progressive assimilation. However, the action of syncope in this case creates an illicit cluster of the form **TRT, viz. /μln/, which is resolved through the appearance of an epenthetic vowel before the medial sonorant. Similarly resolved is the final cluster of the form **TR#, viz. /θ′r′/, which is also broken up by an epenthetic vowel.

This concludes the discussion of vowel epenthesis in Old Irish, although numerous examples can be found in chapters 5 and 6, which are devoted to Old Irish verbal morphology. The next subsection looks at consonant excrescence in the language.

3.3.2.3. Repair of illicit structures: consonant excrescence

While vowel epenthesis breaks up illicit consonant clusters of the form **TRT or **TRT or **TR#, consonant epenthesis, or *excrescence*, breaks up illicit vowel clusters, i.e. **VV, and resolves final vowels not followed by an abstract consonant, i.e. **V#. These two phenomena occur in quite different contexts, but function essentially in the same manner. The excrescent consonant is always abstract and its colour is generally the same as that of the consonant to its left.

Illicit **VV vowel clusters occur when a vowel-initial formative suffix is added to a stem with the shape XV-. This occurs in the nominal system in a number of contexts, but is perhaps more frequent in the verbal system, where it occurs regularly in many forms of the hiatus verbs (see 5.1.4), which are so called because they frequently exhibit vowels in hiatus (see 3.2.3.4, above). Similarly, excrescence with illicit **V# structures does occur in the nominal system, but is perhaps more widespread in the verbal system, where it is quite regular in forms such as the conjunct third person singular of the s-subunctive, discussed in 6.1.1. The two types are discussed as medial and final excrescence respectively in what follows.

To take an example of final excrescence from the nominal system, *rí* ‘king’ and *brí* ‘hill’ are the nominative singular forms of two velar stem nouns. In the oblique cases, they have, like *cathir* above, a velar fricative extension, e.g. nominative plural and accusative/dative singular *ríg* and *brig*; genitive singular and plural *ríg* and *breg*; accusative plural *ríga* and *brega*. As can be seen from these examples, *rí* has a long

vowel throughout the paradigm, whereas *brí* has a long vowel only in the nominative singular, i.e. when no consonant follows. This suggests that the vowel in *brí* is a lengthened short vowel, rather than an underlying long vowel, while the vowel in *rí* is underlyingly long.

To account for this difference, one can thus posit the representations /R′ə∅′-/ and /b′r′ə-/ for the roots of *rí* and *brí* respectively. The stem for the oblique cases is formed with the velar fricative /-ɣ-/, yielding the stem /R′ə∅′ɣ-/ for *rí*, and /b′r′əɣ-/ for *brí*. The case endings then consist of various combinations of abstract consonant or vowel plus abstract consonant, /-∅′/ for the nominative plural and accusative/dative singular, /-∅/ for the genitive singular and plural, and /-a∅/ for the accusative plural. The nominative singular, on the other hand, is formed from the bare root. In the case of rí, the root /R′ə∅′/ is already adequate as a surface form. However, the root of *brí*, /b′r′ə-/, is illicit in the phonology of Old Irish, and is thus supplemented by an excrescent abstract consonant, the colour of which is identical to that of the preceding colour specification, here i-colour. This yields the correct surface form /b′r′ə∅′/, where the final abstract consonant is excrescent, not underlying.[178]

The same phenomenon can be observed in a number of paradigms in the verbal system. Strong B1 and B2 verbs taking the s-subjunctive (see 6.1.1) have a final /-s/ in all persons of the present subjunctive, except for the conjunct third person singular, where the lack of this /-s/ is part of the exponence of that particular morphological category. This leaves underlying forms ending in the elicit structure **V#. These are extended by an excrescent abstract consonant whose colour copies that of the preceding node on the colour path.

With respect to medial consonant excrescence, i.e. an abstract consonant breaking up vowels in hiatus, this is particularly frequent for hiatus verbs (see 5.1.4), but is also attested in the nominal system. An example is *lie* ‘stone’ (*GOI*: §321), whose oblique forms have a stem in /-g-/ (see Bergin 1938b). This noun can be understood as having the root /L′ə-/, with a nominative singular in /-a∅′/, in parallel to *aire* ‘noble’.

Attested forms include nominative singular *lie* (Wb21b6), accusative singular *liic* (LU5365), genitive singular *liac* (Sg22b10), dative singular *liic* (Fél Oct 5),

[178] Parallel examples with initial u-colour, such as the velar stem *trú* ‘doomed man’, and the nasal stems *cú* ‘hound’, *dú* ‘place, land’, and *brú* ‘belly’ seem to have <o> rather than <u> in the oblique stems. Often this can be explained by metaphony, with lowering before an a-colour consonant (see 3.3.3.3, below), but this is not the case for all forms, e.g. *coin*, accusative/dative singular of *cú* ‘hound’.

nominative plural *lieic* (Sg18b7), and accusative plural *legga* (LL227a33). These forms, and particularly the contrast between <ia> in the genitive singular and <ie> in the nominative plural, discussed in are perhaps best explained if the excrescent consonant is understood to be a copy of the colour of the *following* consonant, rather than that the preceding one, although the evidence is not unilateral, and there are cases in which it would be better to analyse the data the other way. In my representations in chapters 5 and 6, I have assumed that the excrescent consonant takes its specification from that of the following colour specification, except in cases in which the orthography suggests differently.

This concludes the discussion of consonant excresence, and indeed of phenomena of syncope and epenthesis in Old Irihs more broadly. The next subsection discusses phenomena of assimilation in the language.

3.3.3. Assimilation

This subsection examines phenomena of assimilation in Old Irish. One can observe that the vulnerability to assimilation of specifications on the different paths is correlated to their sonority profile. Localisation specifications, are relatively immutable, although there are assimilatory phenomena associated to their intensity, whereby two homorganic fricatives yield a corresponding stop (see 3.1.2.4). Assimilation of manner is relatively common, while assimilation of colour and height are pervasive in Old Irish. Aside from the word boundary phenomena discussed subsection 3.3.2.1, above, assimilation of stress is absent from Old Irish. With respect to the paths of localisation and colour, one can thus state that assimilation of what is conventionally referred to as primary localisation or primary place of articulation is absent from Old Irish, while assimilation of secondary localisation or secondary place of articulation is common.

Assimilation of manner specifications have already been touched upon in the discussion on nasalisation 3.3.1.4, but are dealt with in detail in 3.3.3.1, below. Assimilation of colour specifications are pervasive and extremely important for the description of the Old Irish verbal system in chapters 5 and 6. These are covered in 3.3.3.2. Assimilation of height also occurs, and is examined in 3.3.3.3, under the rubric of metaphony.

3.3.3.1. Manner assimilation

There are two primary phenomena in which specifications are assimilated on the path of manner. The first involves the assimilation of unaspirated consonants to aspirated, while the second involves the assimilation of unaspirated stops to homorganic nasals. In terms of the formalism adopted in this work, both of these involve the assimilation of a neutral {o} specification on the manner path. In the first case, this involves assimilation of {o} to a {H} specification, characterising an aspirated consonant, /s/, or /h/, while in the second it involves assimilation of {o} to an {L} specification, characterising a nasal.

Assimilation of aspiration can be observed with the behaviour of certain forms of the definite article in Old Irish, namely: masculine and neuter genitive and dative singular, masculine nominative plural, and feminine nominative and dative singular. The underlying form of the non-dative forms is *ind*, leniting, /∅ʼən˚d˚[L]/.[179] As discussed in 3.3.1.4, above, /s/ is lenited to /h/. Thus, when these forms of the definite article precede a noun with initial underlying /s/, a cluster /ndh/ results, and assimilation of the obstruent to the following /h/ occurs, yielding the allomorph *int* /∅ʼən˚t˚/.[180]

The table below illustrates this phenomenon with the example of the feminine *samail* ‘likeness’ in the table below. It should be noted that in the glosses it is only in the orthography of the St. Gall corpus in which the lenition of /s/ is regularly shown, by means of writing the punctum delens above the consonant, viz. <ṡ>, while in the earlier glosses, simply <s> is most often written.

Table 39. Manner assimilation in *int ṡamail* ‘the likeness’

	int ṡamail																				
Localisation			(o)		ʔ		L								o		L				
Manner			L(o)		H		L		h					L	H		L		h		
Colour	H		L		o		o		H	→	H		L		o		o		H		
Height		H				L		H					H					L		H	ʔ

[179] At least in the Würzburg glosses, this form is preserved before sonorants and abstract consonants, be the latter radical or resulting from the lenition of /φ/. Elsewhere, the most common spelling of the article is *in*, but it is unclear whether this represents simply a loss of the stop between consonants, or /N/ resulting from the assimilation of the stop to the preceding nasal. While the spelling *inn*, suggesting the latter, is also found, it is rare. One might also expect assimilation of the localisation of the nasal to the following obstruent, as there is to this day in Scottish Gaelic, but this is not represented in the orthography of the Old Irish period to my knowledge.

[180] While it is possible to describe this allomorphy in Old Irish synchronically in terms of assimilation, it is doubtful if the same is true of the alternation between *in* and *int* for the masculine nominative definite article in the language. For an analysis of the historical development of this see Jaskuła (2006: 47ff.).

Stress	o	H	L	o	H	o	ʔ
Transcription	∅′ ə n°d°	s a	μ ə l′	/∅′ənˠ°ˈtaμəl′/			

After the definite article *ind*, the manner specification of the initial consonant of *samail* is altered through lenition (see 3.3.1.4), its manner specification being attenuated from {H} to {H}. It then assimilates the preceding {o}, and both localisation and manner specifications are syllabified together as the initial of the stressed cycle, as /t/. This operation, interestingly, occurs across the boundary between the *iairmbéarla* and the *focal*. As can be seen from the table above and explored further in 3.3.3.2, below, colour specifications do not assimilate across the boundary of *iairmbéarla* and *focal* in the same way. Similarly, the *iairmbéarla* does not count towards stress assignment in the *focal*.

While allomorphy such as that discussed above is not uncommon in Old Irish morphology, the assimilation of lenis stops to homorganic nasals, i.e. of {o} to {L}, occurs most visibly in the nasalisation mutation, discussed in 3.2.1.4, above. Elsewhere, there is orthographic free variation between forms in <nd> and <nn>, and between <mb> and <mm>, in coda position. The assimilation of manner with aspirated stops, i.e. {H} specifications being lowered to {o} by a preceding {L}, also occurs in the nasalisation mutation, and here and there in the verbal morphology too. It is discussed where appropriate in the relevant passages of chapters 5 and 6.

It is clear that the assimilation of a nasal plus lenis obstruent cluster, e.g. /nd/, to an obstruent nasal, e.g. /N/, is phonological, as is the assimilation of an unaspirated obstruent plus /h/, e.g. /dh/, to an aspirated obstruent, e.g. /t/. However, what is not so clear is the extent to which assimilation of aspiration occured more generally. After /s/ there is clearly no contrast between unaspirated and aspirated stops, but Old Irish orthography elsewhere seems quite tolerant of symbols conventionally used for aspirated and unaspirated consonants being used side by side. On the other hand, such assimilation can probably be assumed from the evidence of later stages of the language. While further corpus based research on this topic is a desideratum, the main focus of the current research is on consonant colour, and the following paragraphs examine assimilatory phenomena on the colour path.

3.3.3.2. Colour assimilation

This subsection examines assimilatory phenomena on the path of colour. Two distinct types of chromatic assimilation must be recognised. Firstly, there is assimilation of consonant colour when two consonants fall together through syncope. Secondly, there is assimilation of a final consonant to a following abstract consonant formative. The first type of assimilation is progressive, while the second is regressive. As noted above, colour assimilates only within the domain of the *focal*, not across the boundary of *iairmbéarla* and *focal*.[181]

Assimilation of colour when two consonants fall together occurs frequently and is progressive, in that the cluster formed retains the colour of the first consonant, rather than that of the second. An example of this comes from the verbal system. Two verbs *canaid* 'sings' and *guidid* 'prays, asks' have the present stems /kan-/ and /g˚əð′-/, with a final a-colour and final i-colour consonant respectively (see 5.1.2.2 and 5.1.2.3). The first person plural relative ending is disyllabic /-əm′ə∅′/[182] and when it is added to these stems its first vowel is syncopated. The resulting forms are *canmae* (Fél Ep. 242) from *canaid*, and *guidme* (Wb4a27) from *guidid*, clearly indicating the a-colour of the /m/ in the first instance, and the i-colour of the /m′/ in the second. The derivations are /kan-əm′ə∅′/ → /kanma∅′/, and /g˚əð′-əmə∅′/ → /g˚əð′m′ə∅′/ respectively with progressive assimilation of consonant colour.

In contrast to this, there is a phenomenon of regressive assimilation to a final abstract consonant. This is highly important in the system of Old Irish phonology proposed in this work, as final consonant colour frequently differentiates morphological forms within a paradigm, such as the o-stem nominal paradigm discussed in 3.1.2. When consonant colour is the exponent of a given morphological category, such as u-colour for the dative singular of o-stem nouns, then that is represented here by means of a final abstract consonant formative.

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[181] Assimilation of colour across the boundary between *focal* and *barr* (see 1.2.2 for discussion of this terminology) occurs somewhat inconsistently in the early period (see *GOI*: §403).

[182] Evidence for a disyllabic ending comes from forms such as absolute present first person plural *lathrimmi* (Wb8d19) from *láthraid* 'arranges, disposes', built from *láthar* 'arrangement, disposition'. The lack of syncope of the first vowel of the ending can be explained by the fact that the second vowel of the base is syncopated instead, i.e. /La∅θar-əm′ə∅′/ → /La∅θrəm′ə∅′/.

Thus, nominative singular *fer* /φ′ər/ ‘man’, genitive singular *fir* /φ′ər′/, and dative singular *fiur* /φ′ər°/ can be seen to share a common stem, /φ′ər-/, to which the formative /-∅′/ is added in the genitive singular, and /-∅°/ in the dative singular, with the nominative singular, consisting in the bare stem, /-/, or alternatively being characterised by a nominative singular formative /-∅/. The derivations in these cases are thus genitive singular /φ′ər-∅′/ → /φ′ər′/, spelled *fir*, and dative singular /φ′ər-∅°/ → /φ′ər°/, spelled *fiur*.

As can be seen in these examples, the genitive and dative singular have spellings which suggest they have a surface high vowel. The nominative singular, however, spelled with <e>, suggests rather a mid vowel. This results from height assimilation, which is the topic of the next subsection.

3.3.3.3. Height assimilation, or metaphony

The most important phenomenon to be observed with respect to the assimilation of height specifications in Old Irish is termed here *metaphony*. This lowers a {H} specification to {L} on the path of height when the following colour specification is {o}. In other words, /ə/ is lowered to /a/ before an a-colour consonant, be it concrete or abstract. This rule is exceptionless and occurs with great frequency. Height assimilation also occurs sporadically in other contexts, but never with sufficient frequency or regularity to be considered even a phonological tendency, much less a rule. Most striking are isolated cases of /a/ in both syllables of a disyllabic word, where /ə/ might be expected in the second syllable: several examples of this are discussed further in 5.1.2.2, which is devoted to strong verbs which take the a-colour pattern in the present.

The rule of metaphony is pervasive throughout the nominal and verbal systems. It accounts for alternations such as *fer~fir~fiur* for the nominative, genitive, and dative of *fer* ‘man’, discussed above, but examples are not lacking in the verbal system either. The most common group of strong verbs show an alternation in the colour of their stem-final consonant in the present. For some persons it has i-colour, whereas for others it has a-colour. In these instances, a high vowel is frequently found before the i-colour stem-final consonant, while a mid or low vowel is invariably found before the a-colour stem-final consonants. For example, the conjunct third person singular is characterised

by i-colour, whereas the third person plural is characterised by a-colour. For the verb *con·icc* 'is capable of', one finds <i> in third person singular *con·icc* (Sg27a18), but rather <e> in third person plural *con·ecat* (Sg33a16).

In the binary approach to Old Irish phonology, which recognises only two distinct consonant colours in the language, metaphony cannot be considered a phonological rule. This is because high vowels can occur before broad consonants in the binary approach. The result of this is that the extremely frequent alternations between <i> and <e>, and between <u> and <o>, must be considered morphonological alternations in the binary approach and have no synchronic phonological status. It is thus a key advantage of the ternary approach to Old Irish phonology that a large number of differences between related morphological forms that were previously considered to be morphonological, i.e. fossilised alternations which are not synchronically predictable, can now be considered phonological, falling out directly from the phonological representations put forward.

An important distinction must be made between *metaphony* and what is termed here *ablaut*. While metaphony is a regular and exceptionless phonological rule in Old Irish, ablaut is rather a property of certain morphological categories. In the case of ablaut, the alternations between vowels in different morphological forms are not phonologically, but rather morphologically, motivated. An example of this may be found in the paradigm of a verb such as *beirid* /bʹarʹəθʹ/ 'carries', which has a present conjunct second person singular form *·bir* /bʹərʹ/ on the one hand and a present conjunct third person singular form *·beir* /bʹarʹ/ on the other. In this instance, the alternation is not automatically predictable from a change in the colour of the following consonant – indeed, that consonant has i-quality in both forms – but must rather be seen as a morphologically induced alternation between /ə/ in *·bir* and /a/ in *·beir*. As discussed in section 5.1, the stem here is best analysed as being /bʹarʹ/, and raising to /ə/ appears to be correlated to specific person endings.

There are further cases in which it is not clear to what extent the alternations are truly morphologically determined and to what extent they are, synchronically, merely an idiosyncratic property of a given paradigm. An example comes from ā-stem nouns, such as *tol* 'will'. The genitive singular form is *tuile* /t˚əlʹa∅ʹ/, which suggests that this lexeme the underlying form /ə/, which is then neutralised to /a/ before a-colour in nominative singular *tol* /t˚al/ and nominative and accusative plural *tola* /t˚ala∅/. However,

the accusative singular form occurs eight times in the Würzburg glosses as *toil* and never as *tuil*. In the dative singular there are seven instances of *tuil* in Würzburg and two of *toil*.

It is tempting here to see the /ə/ which occurs in the genitive and dative singular forms as a morphological exponent of those categories in this declension class. The paradigm given by Stifter (2006: 60) for *cell* 'church, monastic settlement' would also suggest this. However, further examples from the Würzburg glosses suggest the picture is somewhat less clear. The noun *croch* 'cross' behaves similarly to *tol* in that it has <o> in the nominative singular, <oi> in the accusative singular (four times) and <u> in the genitive singular. However, it has <oi> in the dative singular as well. Similarly, *crot* 'harp' is spelled *croit*, not *cruit*, in the dative singular.

The evidence from nouns with <e> rather than <o> in the nominative singular is even less convincing. Forms such as *serc* 'love', *ferc* 'anger', *fecht* 'journey' and *delb* 'shape' never show a high vowel in either the genitive or dative singular in the Würzburg glosses. The only examples I could find where this occurs with initial i-colour in that corpus are for *breth* 'carrying', which has genitive singular *brith* (once) and dative singular *breith* (once), and *fled* 'feast', which has dative singular *flid* on one occasion.

A better solution might be to argue that /a/ is the morphological exponent of the accusative singular in ā-stem nouns, that the lexemes in which the vowel does not alternate have underlying /a/, while those that do, such as *tol*, have underlying /ə/. The inconsistencies in the dative singular can be seen as analogical pressure from the accusative singular (as well as from the forms with a-colour coda consonants). The alternative would be to lexically mark these nouns, as one would have to do in the traditional and binary approaches.

In this subsection, the various assimilatory phenomena to be observed in Old Irish have been laid out. This follows on from the discussion of other phenomena concerned with sound in this section, including the various mutation trajectories of Old Irish in 3.3.1, and the key phenomena of syncope and epenthesis in subsection 3.3.2. As a whole, this chapter has outlined the phonology of Old Irish as it is understood in this work, both the static aspects of the phonology, discussed alongside the model in 3.2, and the dynamic aspects, covered in the current section. It has also, in 3.1, given an overview of how the phonology of Old Irish relates to its orthography. The next chapters put this model into practice through an empirical description of the Old Irish verbal

system. Chapter 5 looks at flexional patterns in the Old Irish present, while chapter 6 concentrates on the subjunctive, future, and preterite. However, some preliminaries are necessary first, and the next chapter discusses the verbal system as a whole.

Chapter 4: The Old Irish verbal system

4.1. Introduction to the Old Irish verbal system

The Old Irish verbal system is, to put it mildly, quite complex, even by the standards of an older Indo-European language. For this reason, and to aid readers who might not be familiar with its particularities, or the terminology used to describe them, this chapter aims to introduce the Old Irish verbal system.

In the following sections, the structure of the Old Irish complex phrase as it is understood in this work is presented, and its internal structure explored. This section lays some foundations, with the terminology used in discussion of the Old Irish verbal system set out in 4.1.1, the main patterns of Old Irish verbal inflexion examined in 4.1.2, and an overview of the prosody of the Old Irish verbal phrase outlined in 4.1.3. Following this relatively brief introduction, section 4.2 goes into detail on the internal structure of the domain preceding the primary stress, termed here the prenuclear constituent, while section 4.3 deals with the domain of primary stress, termed here the nuclear constituent.

4.1.1. Terminology

A number of important terminological distinctions used in the description of Old Irish verbal morphology are discussed in this subsection. These distinctions are generally binary, and serve to differentiate categories of verbs or patterns of verbal inflexion.

One such distinction is that between *simple* and *compound* verbs. The former consist of simply a verbal root, from which a tense stem is formed, and to which person endings are added in conjugation. The latter consist of both a verbal root and one or more preceding elements. These preceding elements are mostly derived from and homophonous to prepositions and serve to alter the meaning of the verbal root in various ways.

For example, *canaid* is a simple verb meaning 'sings',[183] with an underlying root *can*-, /kan-/. A compound verb formed from this same root, is *for·cain*[184] 'teaches', with the preceding element *for* /φ˚ər/, which when used as a preposition means 'on, over'. This phenomenon also occurs in other Indo-European languages, e.g. Eng. *forget*, Ger. *umbringen* 'murder', Lat. *comparare* 'compare', Gk. ἐκδίδωμι 'surrender',[185] but is particularly common in Old Irish.

When the verb stands alone at the head of its phrase, it is said to be independent. On the other hand, when it is preceded by one of a fixed set of particles, it is considered to be dependent. These particles are known collectively as *conjunct particles* and include the negative particles, most importantly *ní*, the interrogative particle *in*, relative particles fused with prepositions, as well as a number of question words and conjunctions (see *GOI*§38 for a comprehensive list). These conjunct particles and the originally prepositional elements capable of preceding verbal roots are referred to collectively as *preverbs*. The distinction between independent and dependent has far-reaching consequences, as different inflectional patterns are associated to each, as explored in the next subsection.

4.1.2. Patterns of inflexion in the Old Irish verbal system

Simple verbs, when independent, take what is known as *absolute* flexion, e.g. *beirid* /ˈbʹarʹəθʹ/ 'he/she carries'. When dependent, they take instead what is termed *conjunct* flexion, e.g. *ní·beir* /ˌNʹə∅ʹ·ˈbʹarʹ/ 'he/she does not carry', preceded by the negative par-

[183] Old Irish verbs are cited in the third person singular present indicative.
[184] The raised dot is used to separate the preverbal portion of the verbal phrase from the part of the constituent bearing primary stress (see below). The hyphen is used to separate morphemes.
[185] These are, respectively, from *for* plus *get*; from *um* 'around' plus *bringen* 'bring'; *com* 'with' plus *parare* 'buy, get'; ἐκ 'from, out of' plus δίδωμι 'give'.

ticle *ní* and thus presenting a different inflexional ending. With a compound verb, such as *do·beir* ‘gives’, the terminology is different. When the verb is independent, it is said to be *deuterotonic*, as the primary stress falls on the second part of the compound, e.g. *do·beir* /ˌd°əˑˈbʹarʹ/. As can be seen by comparing this example to the previous one, the conjunct flexion of simple verbs is the same as the deuterotonic flexion of compound verbs with a single preverb, e.g. *ní·beir* and *do·beir*. Although the first of these examples is dependent and the second independent, they have the same flexion because both have one and only one preverb before the verbal root.

When a compound verb is dependent, it is said to be *prototonic*, as the stress falls on the first element of the compound, e.g. *ní·tabair* ‘does not give’ /ˌNʹəØʹˑˈtaβarʹ/. As can be seen from this example, the shift from deuterotonic to prototonic causes the preverb to fall under the primary stress and the verbal root to move into unstressed position to its right, where it is subject to the weakening associated to unstressed position, most importantly syncope if another syllable follows (see 3.3.2). Preverbs in the same stress domain as a verbal root may also trigger consonant mutation, causing further modification the initial consonant of the verbal root.

Preverbs generally have two main allomorphs: one appearing when the preverb occurs in the prenuclear constituent, the other when it appears in the nuclear constituent. Preverb allomorphy is dealt with further in section 4.2.2, below, while the next subsection gives an overview of the prosody of the Old Irish verbal phrase.

4.1.3. Prosody of the Old Irish verbal phrase

The picture which emerges from the preceding is that there are two main constituents to the verbal phrase: a *nuclear consitituent*, which contains the conjugated verbal form, including, optionally, one or more preverbs, and, except in the case of the absolute flexion of simple verbs, a secondary *prenuclear constituent*. I have followed the widespread convention of using the raised dot · to mark the left edge of the nuclear constituent, both in citations and in reading transcriptions.

Following the nuclear constituent, there is also an optional postnuclear constituent, which can host a series of particles traditionally known as *notae augentes*. While these have been described as emphasising particles (e.g. *GOI*§403-4) and continue to be

labelled as such in many descriptions of Modern Irish (e.g. Mac Murchaidh 2006: 257ff.; Doyle 2001: 38f.), recent work has reassessed their function (Eska 2009; Griffith 2008, 2011; Kern 2013).

This picture *is grosso modo consistent* with the analysis of Classical Irish grammar laid out in the Irish Grammatical Tracts (*IGT*: Bergin 1916-55; BST: McKenna 1944; commentary in Adams 1970), which defined the *focal* 'word' as a stressed domain with semantic content, with an optional preceding function word (*iairmbéarla*, literally 'hindspeech') and an optional following particle (*barr*, literally 'summit'). This terminology has already been discussed in subsection 1.2.2. In the terms used here, the prenuclear constituent is host to *iairmbéarla* elements, while the nuclear constituent is host to *focal* elements.

The boundary between the prenuclear and nuclear constituents is the locus of grammatical consonant mutation (see 3.3.1). Elements to the left of the boundary are triggers for mutation, while elements to the right are targets for it. The following section, 4.2, further explores the nature and composition of the prenuclear constituent, while section 4.3 examines rather the nuclear constituent.

4.2. The prenuclear constituent

This section discusses the prenuclear constituent of the Old Irish verbal phrase, while the nuclear constituent of the. The general structure of the prenuclear constituent is outlined in subsection 4.2.1, below, while allomorphy in preverbs is the topic of 4.2.2.

4.2.1. Structure of the prenuclear constituent

This subsection discusses the general structure of the prenuclear constituent of the Old Irish verbal phrase. Subsection 4.2.1.1 examines the various elements which may appear in this constituent, as well as giving a number of examples of verbal phrases from Old Irish containing prenuclear elements. Subsection 4.2.1.2, on the other hand, looks at the question of stress in the prenuclear constituent, which has generated a certain amount of academic debate.

4.2.1.1. Composition of the prenuclear constituent

The prenuclear constituent is composed of a preverb, which may be either a conjunct particle or a prepositional preverb, and optionally also a pronominal clitic following the preverb. The difference between conjunct particles and prepositional preverbs is that the former are always found in the prenuclear constituent (i.e. a conjunct particle is by nature an *iairmbéarla* in the terms of classical grammar), while the latter are only found in the prenuclear constituent when there is no conjunct particle available to fill it. The conjunct particles fall into the following categories, outlined by Thurneysen (*GOI*: §38): negative particles, interrogative particles, combinations of preposition plus relative particle, and a small number of conjunctions. In some cases, compound conjunct particles are found, combining two or even three of the elements set out below.

The most important negative particle is *ní*^{G}, but a range of other forms are also found, such as *nicon*^{L}, *ná*^{G}, *nad*^{L}, *nacon*^{L} etc.[186] (*GOI*: §860ff.). The negative particles can be preceded by unstressed function words such as *ma*^{L}- and *ce*^{G}- (*GOI*: §38) and can be followed by the pronominal clitics known as infix pronouns (see below). The main interrogative particle is *in*^{N}, negative *in-nad*^{L},[187] but also *co*^{G} 'how' and *cecha* 'whomsoever, whatsoever' induce conjunct flexion.

Relative clauses in Old Irish are introduced by special relative verbal forms for the third person and first person plural and by either lenition or nasalisation of the initial of the nuclear constituent in other cases (*GOI*: §493ff.). Where "a preposition is required to express the relation of the antecedent to the remainder of the relative clause" a combination of preposition plus –(*s*)*a*^{N}[188] is used, e.g. *di-a*^{N} 'of which', *occ-a*^{N} 'at which', *la-sa*^{N} 'with which', etc. Similarly formed are the conjunctions *dia*^{N} 'when, if', *ara*^{N} 'in order that', and *co*(*n*)^{N} 'until, so that'.

When there is no conjunct particle to head the prenuclear constituent, the first preverb of a compound verb instead becomes the head of the constituent. Hence, one

[186] Variants of *ní* with both short and long vowels are found. In this introduction, and elsewhere where these particles are discussed, I have standardised the spelling by writing a long vowel when *ní* and *ná* stand alone or followed by an infixed pronoun and the variants with short vowels elsewhere. No such practice seems to have been followed by the scribes, who were somewhat inconsistent in their orthographic practices.

[187] The variant *in-ni-nad-* is found in the Milan glosses.

[188] The forms with -s- are used after prepositions which historically ended in a consonant, although in Old Irish this is no longer predictable from the phonological form of the prepositions in question.

finds negative *ní·tabair* ‘does not give’, with the negative particle *ní*, but *do·beir* ‘gives’, where there is no conjunct particle to fill the prenuclear constituent. Prepositional preverbs can thus be found in either the prenuclear or the nuclear constituent and the form they take differs considerably in each. Allomorphy in preverbs is the focus of section 4.2.

Worthy of special mention in this regard is the preverb *ro*, whose behaviour is somewhat indeterminate between that of a prepositional preverb and a conjunct particle. In some cases, *ro* forms part of a compound verb, and in this sense behaves similarly to the other prepositional preverbs, e.g. *ro·cluinethar* ‘hears’. However, by the Old Irish period it had been grammaticalised with resultative or potential meaning (see the thorough overview in McCone 1987: 93ff.). Furthermore, the position of *ro* in the verbal complex is governed by different principles to either that of the conjunct particles or the other prepositional preverbs, and two quite distinct patterns are found (see *GOI*: §527).

To the head of a preverb, be it a conjunct particle or a prepositional preverb, can be added a pronominal clitic. There are three series of these pronominal clitics, which are normally referred to as infixed pronouns (*GOI*: §409ff.). One series is used after preverbs originally ending in a vowel, another after preverbs originally ending in a consonant, and a third after nasalising relative particles. Generally speaking, the members of the first series are consonantal (third person singular masculine/neuter excepted) while the members of the other two series consist of a full syllable (again excepting the third person singular masculine/neuter). These clitics always fall in the final position of the prenuclear constituent and can trigger consonant mutation of the following initial.

This is illustrated below, using examples from the first series. The first person singular infixed pronoun is *–m*(*m*), i.e. /-m^{L}/ and the feminine third person singular is *-s*, i.e. /-s^{N}/. These are shown below, added to third person plural of the verb *caraid* ‘loves’ and the third person singluar of the verb *do·gní* ‘does, makes’:

(6)	ˌN′ə∅′-	m^{L}	·ˈkar-ad-	ˌsa∅	→	ˌN′əm′·ˈxaradˌsa∅
	NEG 1SG.		love-PRES.3PL.	-1sg.		*ním·charatsa*[189] (Wb5c6)
	‘they do not love me’					

[189] Note the use of first person singular *-sa* in the postnuclear constituent of a third person plural verb (see Griffith 2011).

(7) ˌd°a- s^{N} ·ˈgʹnʹə- → ˌd°as·ˈŋnə∅ʹ

to 3SG.FEM. do-PRES.3SG. *dus·ngní* (Ml29a3)

'he makes it (fem.)'

There are two cases in which the presence of a prenuclear constituent is obligatory. Firstly, the verbal tenses that take the secondary person endings (see subsection 4.3.3 below) are always found with a prenuclear constituent. Secondly, as a clitic requires a host, pronominal clitics such as those in the examples above cannot be used in the absence of a preverb. When a preverb is not already present and one is required, the dummy preverb *no* is used instead. This preverb has no semantic content, but serves solely to populate the prenuclear constituent. An example is given below with the verb *beirid* 'carries' and the feminine third person singular infixed pronoun *–s*.

(8) ˌN°a- s ·ˈbʹarʹ-əθ → ˌN°as·ˈbʹarʹaθ

no- 3SG.FEM. carries-IMPF.3SG. *nos·bered* (Tur. 134)

'he was carrying it (fem.)'

In this subsection, the various components of the prenuclear constituent have been laid out. The following subsection examines the question of stress in this constituent.

4.2.1.2. Stress in the prenuclear constituent

While the prenuclear constituent of the verbal phrase is often considered to be fully unstressed, Watkins (1963), considered it to have secondary stress. This view was challenged by McCone (1981), within the context of establishing a rule of voicing for dentals in contact with unstressed vowels at the word boundary,[190] and by Sims-Williams

[190] McCone's arguments rest on a desire to unify the apparent sound change /t/ > /d/ word finally after an unstressed vowel with the occurrence of /d/ in *do·* (for earlier *to·*) in the prenuclear constituent corresponding to /t/ in the nuclear constituent. I have argued elsewhere (C. Anderson 2015a) that while Old Irish was most likely an "aspiration" language, contrasting aspirated /t^{h}/ and passively voiced /d̥/, Common Celtic was most likely a "voicing" language, contrasting plain /t/ and fully voiced /d/. I proposed a mechanism whereby this shift in laryngeal typology resulted from the transfer of laryngeal features from devoiced vowels, which were subsequently lost through apocope and syncope. If this hypothesis, or a

(1984) on the basis of arguments about stress contours. However, the idea of preverbs carrying secondary stress has recently been reprised by Kern (2010).

She points out that the prenuclear consituent may consist of up to three syllables, once both disyllabic preverbs and pronominal clitics are taken into consideration. This makes it difficult to predict the position of the primary stress in larger compounds unless the preverb was capable of carrying secondary stress. In the phonological model adopted here, elements of the prenuclear constituent can be considered unstressed, i.e. they have the specification {o} on the path of stress.

However, it should be noted that syncope does not occur in the prenuclear constituent. This means that while elements in the prenuclear constituent are unstressed, they are never ephemeral, i.e. they always have the specification {o}, never the specification {L} on the path of stress.

It should be stressed that the prenuclear constituent and the nuclear constituent are separate domains for the purposes of syncope, and that colour does not assimilate across the boundary of the two constituents. That notwithstanding, it cannot be easily disregarded that the entire verbal phrase, including prenuclear, nuclear and postnuclear constituents, is typically written as a single word in Old Irish, as pointed out by Thurneysen (*GOI*: §34), and highlighted by Ahlqvist (1974).

The model adopted here thus assumes a verbal phrase composed of a nuclear constituent bearing primary stress on the initial syllable, an optional prenuclear constituent whose elements are unstressed but never ephemeral, and an optional postnuclear constituent which can be filled only by one of the (similarly unstressed) *notae augentes*. The following subsection examines the preverbs of Old Irish, which can appear in either the prenuclear or nuclear constituents, but which have quite different forms in each position.

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version of it, is correct, then the /t^{h}/ in *·tabair* would directly continue Common Celtic /t/, occurring as it does in a position in which it would be frequently in contact with a devoiced vowel, e.g. after preverbs typically causing geminate mutation. However, the /d̥/ in *do·beir*, standing as it does in initial position in its phrase, and therefore never in contact with a voiceless vowel (or, alternatively, never geminated) would not be subject to this change. This means that it could conc*EIV*ably also reflect Common Celtic /t/ directly, as both /t/ and /d̥/ are plain stops, and word-initially there is a cross-linguistic tendency for these to be devoiced, possibly for aerodynamic reasons (Westbury and Keating 1985). McCarthy (2015) shows this to be categorical in Irish English, while Lavoie (2001: 43) gives examples from various languages. A problem for this view is the presence of /t/, not /d/ in the forms of the imperative, e.g. second person singular *tomil* (Wb6c7), from *do·meil*. In this view, these would have to be seen as analogical.

4.2.2. Allomorphy in preverbs

As has been shown in the preceding subsection, simple verbal roots in Old Irish can be compounded by one or more prepositional preverbs. The issue of verbal composition in Old Irish and its prehistory is explored further in Rossiter (2004) and McCone (2006: 177ff.). Frequently, although by no means always, verbal composition appears to be cumulative, in that a compound with three preverbs is built by adding a preverb to a compound with two preverbs, and one with two preverbs is built by adding a preverb to a verb with one preverb. For example, there is a simple verb *orcaid* 'kills, slays'. Built on this is a compound verb *as·oirc* 'cuts down', with one preverb, and built on *as·oirc* is a further compound verb with two preverbs: *do·essuirc* 'saves, rescues'. The order of the preverbs which may be added to a verb does not appear to be arbitrary, as McCone (1987: 90) identifies a positional hierarchy which holds up reasonably well, once calques on Latin verbs are disregarded.

As can be seen from the examples given thus far, the form of preverbs can vary considerably between prenuclear and nuclear position. For the pair of *do·beir* 'gives' and *ní·tabair* 'does not give' the initial consonant of the preverb is written with <d> in the first instance and <t> in the second. For *as·oirc* 'cuts down', above, the prototonic form is *ní·essuirc* 'does not cut down, perpetrate a deed', with <e> rather than <a>. These differences are not random, but rather reflect a systematic pattern of preverb allomorphy conditioned by the constituent in which the preverb is found.

In general, the phonological content of preverbs found in the prenuclear constituent could be said to be impoverished with respect to the same preverbs found in the nuclear constituent. Furthermore, there is neutralisation of a number of preverbs when they occur in the prenuclear constituent. The implication of this is that the prototonic form of a verb cannot be inferred directly from the deuterotonic form. On the other hand, to infer the deuterotonic form from the prototonic form is also clearly impossible, as there is no way of reliably untangling the results of vowel syncope and consonant mutation.

The consequence of this is that a formally adequate analysis of the Old Irish verbal system must rely on concatenation of roots and preverbs. The former are best preserved in deuterotonic forms, e.g. the root /∅°arg-/ in *as·oirc* 'cuts down', whereas the

latter can be inferred from their behaviour in prototonic forms, e.g. the initial /∅′as-/ in *ní·essuirc* ‘does not cut down, perpetrate a deed’.

The following subsections discuss the different preverbs discussed in this section. Subsection 4.2.2.1 examines the preverbs *etar*, *for*, and *imb*, which do not exhibit too much variation. Subsection 4.2.2.2 looks at the preverbs *frith* and *com*, while subsection 4.2.2.3 discusses *ar*. All of these preverbs show considerable variation in nuclear position, but are never neutralised with other preverbs in prenuclear position. The pairs *in* and *ind* (4.2.2.4), *ad* and *aith* (4.2.2.5), and *es* and *us* (4.2.2.6), on the other hand, show considerable neutralisation when they fall in the prenuclear constituent. This is also true of *dí* and *to*, examined in 4.2.2.7. The preverb to exhibits some similarities in terms of its allomorphy with fo, ro, and no which are discussed together in 4.2.2.8. Subsection 4.2.2.9 provides a brief summary. [191]

Tables are provided to illustrate the allomorphy of each of the preverbs discussed in this section. In the tables, the first column gives the form of the preverb I have used in citations of verbal complexes, while the second gives the form of the root in prenuclear position. The third, fourth, fifth, and sixth columns give information about the preverb under primary stress, describing respectively, a phonological context, typical orthography, phonological form, and notes about use. The last column gives an approximate gloss of the meaning.

4.2.2.1. The preverbs *etar*, *for*, and *imb*

The following table shows the allomorphy of the preverbs *etar*, *for*, and *imb* in Old Irish. As stated above, the citation form is given first, then information about the form

[191] Four prepositional preverbs have been omitted from consideration, as they do not occur frequently. The preverb *tarmi·* ‘across, over’ (*GOI*: §854) is attested in two verbs: *tremi·beir* ‘transfers’, which has only two entries in DIL, and *tremi·téit* ‘traverses, transgresses’, seemingly modelled on the Latin, which has around a dozen entries. In nuclear position it appears as *·tairm*^{L}- or *·tarm*^{L}-. There are somewhat more verbs with *íarmi·* ‘after’ (*GOI*: §840), often spelled *íarmo·* (presumably under the influence of the adverbial spelled variously as *íarmo*, *íarmu*, *íarma*, cf. also *œerme·* in Thes. i 5.28, *íarmu·* in Ml130a7,), the best attested of which is *íarmi·foig* ‘seeks after, enquires about’. In this verb, *íarmi·* always appears as *·íar*^{L}- when in the nuclear constituent, but in the one verb I am aware of in which it is not the first preverb, i.e. *do·íarmórat* ‘follows after’ (from *to-iarm-fo-reth-* according to Pedersen 1913: ii492) it seemingly has the form *·íarm*^{L}-. In DIL, there are eight verbs each with *remi·* ‘before, pre-’ (*GOI*: §851) and *tremi·* ‘through’ (*GOI*: §856). They are consistently spelled *·rem*^{L}- and *·trem*^{L}- respectively in nuclear position. Thurneysen suggests that the latter is modelled on the former.

of the preverb in the prenuclear position, then information about its form in the nuclear position, followed by a gloss.

Table 40. Preverb allomorphy in Old Irish: *etar*, *for*, and *imb*

Cit.	Prenuclear	Nuclear				Gloss
		Position	Orthography	Phonology	Notes	
etar	*eter·* etc.	_all	*·etar-*	·∅ʹadar^{L}-		between
for	*for·*	_all	*·for-*, *·fur-*	·φ°ər°^{L}-		‘over’
imb	*im(m)·*	_all	*·im*(*m*/*p*)-	·∅ʹəmb^{L}-		‘about’

The preverb *etar* appears quite consistently as *·etar-*, leniting, under the stress, but shows some variation in prenuclear position. It generally appears as *eter·* in the Würzburg and Turin glosses, and I have generalised that spelling here, but it is spelled as *etir·* in the Milan glosses, and quite variably in those of St. Gall. Furthermore, Thurneysen states that *etar·* is used before infixed pronouns and increasingly also elsewhere in the later language (*GOI*: §835). Even more variation in spelling is found for the same preposition before nouns.[192]

The preverb *for* (*GOI*: §838) appears quite consistently as such in both prenuclear and nuclear position, leniting a following consonant when under the stress. Examples are numerous from the glosses: *for·cenna* ‘finishes’ (Ml67b9), but *ni·foircnea* (Ml102a8); from *for·comai* ‘keeps, preserves’, third person plural *for·comat* (Sg167b1) and *ni·forcmat* (Sg157b9); *for·cain* ‘teaches’ (Ml128d9), but *ni·forcain* (Wb11c19). The verbal noun *fursundud* ‘illumination’ (Ml74b1), from the verb *for·osna*, has <u>, with raising before a high vowel, in parallel with other preverbs, as discussed below. The verb *for·beir* ‘grows, increases’ has the same alternation in colour of the initial of the root in prototonic forms as *do·beir* (see below).

The preverb *imb* is regularly spelled *im·* or *imm·* in prenuclear position. Under the stress, it can be taken to be /·∅ʹəmʹbʹ^{L}-/, leniting, although it should be stated that the consonant cluster /-mb-/ regularly assimilates to /-m-/ in most instances, yielding the regular spelling *·imm-* or *·im-*. However, a root beginning with /-s-/ is lenited to /-h-/ after this preverb, giving the cluster /-mbh-/. As a lenis stop plus /h/ regularly yields the corresponding fortis in Old Irish, the result is /-mp-/ (see 3.3.3.1). Thus, for *imm·soí*

[192] This continues the modern languages: Irish *idir* or *eidir* ‘between’, with slender /-dʹ-/, but Scottish Gaelic *eadar*, with broad /-d-/. When inflected, the broad variant appears in both languages, as it did in Old Irish, e.g. Modern Irish *eadrainn* ‘between us’, *eadraibh* ‘between-you pl.’, *eatarthu* ‘between-them’.

'turns round', the present second person singular is attested as *imme·soi* (Ml111a6), but the third person singular imperfect subjunctive is rather *·impad* (Ml122a14).

As can be seen from this discussion, the preverbs etar, for, and imb do not exhibit extensive allomorphy. In the prenuclear position this is also true of frith and com, examined in the next subsection, but these preverbs show considerable variation in nuclear position.

4.2.2.2. The preverbs *frith* and *com*

In the following table, the allomorphy of the preverbs frith and com is set out. As may be seen, these do not vary too much in prenuclear position, but show considerable variation in nuclear position.

Table 41. Preverb allomorphy in Old Irish: *frith* and *com*

Cit.	Prenuclear	Nuclear				Gloss
		Position	Orthography	Phonology	Notes	
frith	*fris·, frit-*	_C	*·fre-*	·φr′a^{G}-	earlier	'against'
		_C	*·frith-*	·φ′rəθ′^{L}-	later	
		_∅	*·frith-*	·φ′r′əθ′-	surface	
		_∅	*·fres-*	·φ′r′as-	syncopated	
com	*con·, cot-*	_∅, _R	*·com-*, *·cum-*	·k°əμ-		'with'
		_imb	*·coím-*	·k°a∅′m′-		
		_φ	*·co/u-*	·k°ə^{L}-		
		_C	*·co/u-*	·k°ə^{N}-	earlier	
		_C	*·com-*, *·cum-*	·k°əμ^{L}-	later	

The preverb *frith* appears as *fris·* when it appears in the prenuclear constituent, with the byform *frit-* before an infixed pronoun. Under the stress, two principal variants are found. Before vowels, the form of the preverb is regularly *·frith-*, e.g. from *fris·oirc* 'molests, offends' the present third person plural forms *fris·orcat* (Ml86c6) and *nad·frithorgat* (Ml79a2), but there is also a byform *·fres-*, occurring before a syncopated vowel, e.g. *fresdal* (Wb24c11) verbal noun of *fris·indlea* 'meets, answers to', and *·frescai* (Ml62d7), present third person singular prototonic of *fris·accai* (Ml144a2) 'looks forward to, expects'. Before consonants, Thurneysen (*GOI*: §839) distinguishes a later form *·frith-*, leniting, from an older form *·fre-*, geminating. Of the examples I have

gathered, they are roughly equally frequent. The former can be exemplified by *frith-gnom* (Sg106b12), the verbal noun of *fris·gní* ‘exercises, practises’. Common examples of *·fre-* occur in *frecrae*, the verbal noun of *fris·gair* ‘answers, replies’ (Sg193b6), also with the compound *imm·freccair* ‘corresponds’, and in *frepaid*, the verbal noun of *fris·ben* ‘heals’.

The preverb *com* appears regularly as *con·* in prenuclear position. Under the stress, it surfaces as *·com-* or *·cum-* before vowels, e.g. *for·comai* ‘keeps, preserves’, a compound built on *con·oí* ‘protects’.[193] Before sonorants, *·com-* also appears to be regular, e.g. *ad·comla* ‘joins, unites’, built on *con·lá* ‘places together, joins’. Before /-φ-/, the usual forms are *·co-* or *·cu-*, leniting, which occur regularly in those instances where *com* is used instead of *ro* as a resultative marker, e.g. in *do·coid*, the resultative third person singular of *téit* ‘goes’. [194] Not infrequently however, the forms *·co-* or *·cu-*, nasalising, are found instead.[195] These forms, i.e. *·co-* or *·cu-*, nasalising, are those generally found regularly before obstruents, e.g. *for·congair* ‘demands’ (Wb13a27), built on *con·gair* ‘calls, summons’; *·coitsea* (Wb13a10), third person singular present subjunctive of *con·túaisi* ‘hears, is silent’; *cobodail*, verbal noun of *con·fodlai* ‘shares jointly, divides’. Later, the forms *·com-* and *·cum-*, leniting, are found before all consonants.

The distribution of the <o> and <u> in the various forms of *com* found in prototonic position is largely predictable on the basis of the height of the vowel found in the corresponding deuterotonic verb: if the original form has the low vowel /-a-/, then *·com-* is most often used, whereas if it is /ə-/, then *·cum-* is more common. This principle is parallel to the behaviour of *to*, *fo* etc. (see below). Examples of the former pattern have been given above. The latter pattern can be exemplified by *·cumuing* (Wb9d16),[196] prototonic form of *con·icc* ‘is capable of’ (Wb4b11), and *cumtach* (Ml84a11), verbal noun of *con·utaing* ‘builds, constructs’; *cuindchid*, verbal noun of *con·dieig* ‘asks, seeks’; *ad·cuimben* ‘cuts, lacerates’, built on *con·ben* ‘smites, hacks off’. There are, however, a number of counter-examples, e.g. *cotlud*, the verbal noun of *con·tuili* ‘sleeps’; *costud*,

[193] With *-imb-*, rather the form *·coím-* occurs.
[194] The imperative form *colla* (LU5677), from *con·slá* ‘departs’, might also be explained as resulting from *co-*, leniting.
[195] The difference between the leniting and nasalising variants depends respectively on whether the forms in question arose before or after the sound change *w > *f in the prehistory of Old Irish. No doubt the analogical pressure of *ro*, which is the more common resultative marker, and which lenites, helped to maintain lenition in those instances in which *com* was used with that function.
[196] The same form is also spelled *·cumaing* in the Würzburg glosses (Wb11b9).

verbal noun of *con·suidi* ‘places together’.[197] Before *-imb-*, *con* appears as *·coím*. As with the other preverbs that show this conditioned allophony, a more comprehensive study is needed.

The next subsection examines the case of the preverb ar, which is somewhat problematic, as it shows considerable variation in nuclear position for which no obvious conditioning is apparent.

4.2.2.3. The preverb *ar*

The preverb *ar* is consistently spelled *ar·* in prenuclear position, but the orthography varies widely when it forms part of the nuclear constituent. Thurneysen lists it in his grammar as “*air* (*er*, *ir*, etc.)” and states that the variation between these three forms is “limited only by a decided preference for *er* in Milan” (*GOI*: §823), as well as pointing out that the form *·ar-* is regular before *-ro-*. Nominal compounds built on this preposition in the later language are discussed by Ó Maolalaigh (2003), who points to the great variation in the pronounciation of these in modern dialect sources, with vowel reflexes effectively ranging across the entire vowel space.

In order to clarify the situation in Old Irish, I conducted a study of the spelling of *·ar-* under primary stress in the three main collections of glosses, i.e. Würzburg, Milan and St. Gall. I collected all of the verbal nouns and prototonic forms of verbs with *ar* as first preverb and all of the deuterotonic forms of verbs with *ar* as second preverb, and then reduced the dataset to only those verbs attested in more than one of the three corpora. While the situation with regard to the orthography of this preverb is not straightforward, certain patterns do emerge from the data.

The total dataset consisted in 317 tokens, including 115 from Würzburg, 178 from Milan, and 24 from St. Gall. Of these, 161, or just over half, had the form *·air-* (including one instance of *·áir-* in Wb), 97 had the form *·er-* (including two instances of *·eir-* and two of *·aer-*), 29 had the form *·ar-*, 28 had the form *·ir-*, and two had the form

[197] Forms such as *·comraic* (Ml48d2), third person singular present prototonic form of *con·ricc* ‘meets, encounters’; *cosnam*, verbal noun of *con·sní* ‘contends, contests’; and *congnam*, verbal noun of *con·gní* ‘helps, assists’ are not true counter-examples, as /ə/ and /a/ are neutralised in favour of the latter before an a-colour consonant.

·aur-. Thurneysen's observation that *·ar-* is the usual form before *-ro-* holds true, and it is generally quite common before a-colour consonants too (see below).

As far as the other variants are concerned, however, striking differences emerge between the three corpora. In Würzburg, 58% of tokens had the form *·air-*, 24% *·ir-*, and only 4%· *er-*. In St. Gall, admittedly from only 24 tokens, 75% had the form *·air-* and 17% the form *·er-*. In Milan, in contrast, 49% of tokens had the form *·er-*, while 42% had the form *·air-*. In the Milan and St. Gall glosses, *·ir-* does not occur at all in my dataset. These figures substantiate Thurneysen's observation that *·er-* is particularly common in the Milan glosses.

The most interesting patterns emerge when one looks at the occurrence of these forms in individual verbs across the three corpora. Doing this, it is clear that the variation in the orthography of the preverb is not random, but can rather be predicted for each individual verb, and to a large extent, from phonological context.

In one group of verbs, *·air-* is consistently spelled in pretonic position through all three corpora. This group includes *ar·díben* 'cuts off, slays'; *ar·icc* 'meets, finds', as well as its compounds *fo·airicc* 'meets, comes upon' and *imm·airicc* 'concerns, suits'; *ar·sissedar* 'stays, stands fast' and its compound *do·airissedar* 'stands, remains'; *do·airngir* 'promises'; *airitiu*, the verbal noun of *ar·foím* 'receives'; as well as *ar·léici* 'lets go, releases' and its compound *con·airléici* 'permits, allows'. There are 123 tokens of these verbs in the dataset, of which 113 have the form *·air-*. The other 10 tokens include *·áir-* once in Würzburg, seven instances of *·ar-* split between Würzburg and Milan (of which three occur before a-colour forms), and two of *·er-*, both of which occur in Milan. With the possible exception of *ar·léici* and *con·airléici*, *·air-* is followed in all these cases by a root beginning in an i-colour segment and /ə/, i.e. the context /-X′ə-/.

In a second group of verbs, the Würzburg, and, from limited evidence, St. Gall glosses, consistently have *·air-*, while the spelling in the Milan glosses is overwhelmingly *·er-*. In this group, the Würzburg and St. Gall have 17 tokens of *·air-* and 2 of *·ar-* between them, whereas Milan has 40 of *·er-* (plus 1 of *·ær-*), 5 of *·air-*, and one of *·ar-*. This group includes *ar·beir* 'lives' and its compound *do·airbir* 'bends down, subdues'; *ar·ceissi* 'pities'; and *ar·moinethar* 'honours'. With the exception of the latter, these

verbs are characterised by a root beginning with an i-colour segment and the low vowel /a/, i.e. the context /-X′a-/.[198]

The alternation between <ai> and <e> is not uncommon in Old Irish, characterising a number of forms in both the nominal system, e.g. *daig* 'fire' but *dego* 'fire-gen', and the verbal system, e.g. absolute present third person singular *laigid* 'lies', but third person plural *legait* (see section 5.1.2.1, below, for details). The distribution of the spelling *·er-* in the Milan glosses suggests a conditioning factor for this alternation, at least in the version of the language spoken by the scribe of that corpus, i.e. <ai> occurs when the following vowel is mid-high, while <e> occurs when it is low.

In a third group of verbs, the Milan, and insofar as one can tell, also the St. Gall glosses, regularly show the spelling *·er-*, while the Würzburg glosses regularly show *·ir-*. In this group, Milan and St. Gall between them have 30 instances of *·er-* (plus one each of *·eir-* and *·ær-*), 2 of *·ar-*, and 1 of *·air-*. Würzburg, on the other hand, has 26 spellings of *·ir-*, 1 of *·er-*, and 1 of *·air-*. This group includes *ar·foím* 'receives'; *ar·coat* 'prevents, hinders'; *ar·oslaici* 'opens'; the deuterotonic forms of *con·érchloí* 'drives, agitates'; as well as *ar·midethar* 'aims at, attains' and *ar·neget* 'prays'. With the exception of *ar·moinethar*, mentioned above, this includes all the relevant verbs beginning with u-colour in the dataset.[199]

The above discussion may be summarised as follows. Before i-colour, the usual form of the preverb is *·air-*, although Milan has rather *·er-* for a number of verbs, most notably the compounds of *·beir*. Before u-colour, the usual form of the preverb is *·er-* in Milan and *·ir-* in Würzburg, although a variety of spellings are found. Before a-colour, *·ar-* is perhaps the most common form, but there is considerable variation. I suggest that this general distribution can be best understood if the ordinary form of the preverb is /·∅ər$^{\sim L}$-/, with the colour of the /-r-/ originally conditioned by the colour of the follow-

[198] The deuterotonic forms of *ad·éirrig* 'repeats, changes for the better' may also belong here, although the only relevant example from the Würzburg glosses has *eir-*. Although most verbs with this root have *·rig*, e.g. *con·rig* 'binds together', Pedersen considers the root to be *aith-air-reg-* in this instance, compatible diachronically, if not synchronically, with the conditioning suggested here, although it should be noted that this root behaves as though it has /ə/ with the preverb fo, discussed below.

[199] The two instances from *ar·túaissi* 'listens to, keeps silent', and three from *ar·cuirethar* 'increases, extends', none of which are unfortunately from Würzburg, are entirely compatible with this pattern. Of *ar·neget* and *ar·midethar*, which do not have initial u-colour, it is worthy of note that the former is a compound of *guid-*, which does. The latter behaves somewhat unusually also when preceded by *to*, which in this instance does not show the vowel raising which might be expected before a verb with /ə/.

ing consonant, but with this conditioning breaking down in the Old Irish period.[200] The variation in spelling before u-colour points to the difficulty in finding an unambiguous orthography for this rather rare constellation in Old Irish phonology, i.e. /∅əC°/.[201]

Regardless of the spelling, this preverb lenites a following consonant in Old Irish. The table below shows its allomorphy.

Table 42. Preverb allomorphy in Old Irish: *ar*

Cit.	Prenuclear	Nuclear				Gloss
		Position	Orthography	Phonology	Notes	
ar	*ar·*	_all	*·ar-, air-, er-, ir-*	·∅ər$^{\sim L}$-		'for, before'

While the situation with the preverb *ar* is not straightforward, as should be clear from the above discussion, it does not show any variation in prenuclear position, nor does it neutralise with any other preverb. This is not the case for the preverbs discussed in the following subsections. In the prenuclear position, there is neutralisation of the pair *in* and *ind*, discussed in 4.2.2.4, below, of *ad* and *aith*, covered in 4.2.2.5, and of *es* and *us*, examined in 4.2.2.6. Furthermore, all six of these pronouns are neutralised to *at-* before an infixed pronoun.

4.2.2.4. The preverbs *in* and *ind*

The following table shows the allomorphy of the preverbs *in* and *ind* in Old Irish.

Table 43. Preverb allomorphy in Old Irish: *in* and *ind*

Cit.	Prenuclear	Nuclear				Gloss
		Position	Orthography	Phonology	Notes	
in	*in·, at-*	_t, _c	*·é-*	·∅′a∅′^{N}-		'in, into'
		_D, _∅	*·i-*	·∅′ə^{N}-		
		_R, _s	*·e-*	·∅′a^{G}-		
ind	*in·, at-*	_T	*·in-*	·∅′ən′^{L}-		'in, into'
		_φ, _s	*·ind-*, *·int-*	·∅′ən′d′^{L}-		
		_∅, _R	*·ind-*	·∅′ən′d′^{L}-		

[200] An alternative hypothesis, perhaps more in keeping with the observed orthography, but phonologically less regular, would posit /∅ar-/ before a-colour, /∅ar′-/ before i-colour (with /∅′ar-/ in Milan for some verbs), and /∅′ər°-/ (Würzburg) or /∅′ar°-/ (Milan and St. Gall) before u-colour.

[201] Note the discussion of this same constellation in subsection 3.1.2.3. The spellings <aur-> and <ur-> are later common here (Ó Maolalaigh 2003).

For the preverbs *in* and *ind*, Thurneysen lists three different forms – *in*, *ind*, and *en* (*GOI*: §842) – while Pedersen lists two, *in* and *ind* (VGK: 451ff.). Whatever their number, these preverbs generally appear as *in·* in pretonic position, although other forms, such as *ad·* or *as·* are sometimes used instead. Thurneysen considers the conditioning for this to be semantic (*GOI*: §842), although the fact that these preverbs, as well as *ad*, *aith*, *as*, and *us*, are neutralised to *at-* with infixed pronouns, means that a certain confusion is to be expected.

The data I have gathered suggest that only two preverbs need to be posited to account for the various patterns that can be observed in Old Irish, one of which can be straightforwardly posited as *ind*. It is difficult to determine an unambiguous form for the other, but I write *in* in what follows.

Under the stress, *in* surfaces as *·é-*, nasalising, before aspirated obstruents,[202] and as *·e-*, geminating, before sonorants and /-s-/, e.g. *éitset*, third person plural imperative of *in·túaisi* 'listens to' (Wb13a11); singular past participle *ellachtae* (Ml84a6) from *in·loing* 'joins, unites; and *æsnadud* (Ml24c21), verbal noun of *in·snádi* 'defers punishment'. Before fortis obstruents, a short vowel is also found, e.g. *do·ecmalla* 'gathers, collects' (Wb9d5) and *do·ecmaing* 'hits a mark, strikes' (Sg40a16), from *to-en-com-ell* and *to-en-com-icc*, respectively. Before a vowel, the form would appear to be simply *·in-*, e.g. verbal noun *inotacht* (Wb33b5) and future third person plural *ni·inotsat* (Wb33a14) from *in·otat* 'enters into'; *do·inóla* 'gathers, collects', presuming it reflects *to-in-uss-la* (VGK: 511).

The two preverbs appear to be neutralised before unaspirated obstruents as *·in-*, e.g. third person singular present subjunctive *arna·ingre* (Ml111c6) from *in·greinn* 'persecutes'; future third person singular *ní·indail* (Ml36a8) and verbal noun indlach (Wb28b8) from *in·dloing* 'cleaves, separates'. Before fortis stops, *ind* surfaces as *·in*, leniting, e.g. *ní·inchoisig* (Sg9a16) but *in·choissig* (Ml59a7) 'signifies, indicates'. Before /-φ-/ and /-s-/, the form is *·ind-*, leniting, regularly yielding *·int-* in the contexts before /-s-/ (see section x.x.), e.g. *as·indet* 'declares, tells', built on *ind·fét* 'tells, relates'; *do·intai* 'turns back, returns', built on *in·soí* 'turns, returns'; *intamail*, verbal

[202] Thurneysen notes some instances of short *·e-*, nasalising, also before /-k-/.

noun to *in·samlathar* ‘imitates, emulates’.[203] Before vowels and sonorants, the form of the preverb is similarly *·ind-*, e.g. third person singular present subjunctive ara·n-indarbe (Cam37b) from *ind·árban* ‘drives out, expels’; *inn·indmatar* (Ml126c17), present passive plural of *ind·aim* ‘washes, bathes’; imperative *indnite* (Wb10a21) from *in·neat* ‘awaits, stays’.

As noted above, *in* and *ind* are neutralised to *at-* before an infixed pronoun, as also occurs with the preverbs ad and aith, discussed in the next subsection.

4.2.2.5. The preverbs *ad* and *aith*

The following table shows the allomorphy of the preverbs *ad* and *aith* in Old Irish.

Table 44. Preverb allomorphy in Old Irish: *ad* and *aith*

Cit.	Prenuclear	Nuclear				Gloss
		Position	Orthography	Phonology	Notes	
ad	*ad-, at-*	_∅, _φ	*·ad-*	·∅að-		‘to, towards’
		_R	*·á-*	·∅a∅-		
		_C	*·a-*	·∅a^{G}-		
aith	*ad-, at-*	_all	*·a(i)th-*	·∅aθ$^{\sim L}$-		‘re-, ex-’

The preverbs *ad* and *aith* are both realised as *ad·* in prenuclear position. There is a semantic difference between them, glossed by Thurneysen as ‘to, towards’ (*GOI*: §822) and ‘re-, ex-’ (*GOI*: §824) respectively. Under the stress, *ad* surfaces as *·ad-* before vowels and /-φ-/, e.g. *do·aidlea* (Wb9b5)[204] ‘comes to, approaches’, built on *ad·ella* ‘visits, approaches’; *do·adbat* ‘shows, displays’ (Ml19b21), built on *ad·fét* (Ml99d9)[205] ‘tells, relates’. Before sonorants, it surfaces as *·á-*, e.g. protonic *ni·áirmi* (Wb13d17), to deuterotonic *ad·rími* (Wb14d2) ‘counts, reckons’; *áinsem* (Wb4b17), verbal noun to *ad·nessa* ‘lampoons, censures’. Before consonants other than /-φ-/, the form is *·a-*, geminating, e.g. *·aicci* (Ml94c3) to *ad·cí* (Sg149b6) ‘sees’; *ammus*, verbal noun to *ad·midethar* ‘aims at’; *apad*, verbal noun to *ad·boind* ‘proclaims, gives notice’; *ad·aittreba* ‘inhabits, possesses’, built on *ad·treba* ‘inhabits, dwells’.

[203] The verb *do·inscanna* ‘begins’ does not follow the pattern of either *in* or *ind* and might be best viewed as having the underlying root *inscann-*. Its origins are somewhat obscure (Le Mair 2011: 85).
[204] In the original *do-da·aidlea*.
[205] Without the length mark in the original.

When under the primary stress, the preverb *aith* surfaces regularly as *·aith-*, and often also as *·ath-* before a-colour or u-colour, both leniting, e.g. *athchor*, verbal noun of *ad·cuirethar* ‘restores, returns’; *ad·geúin* (Wb12c13) but *ni-n·aithgeuin* (Ml52x00), third person preterite forms of *ad·gnin* ‘knows, recognises’; *·aithidis* (Wb21d11), third person plural imperfect subjunctive of *ad·fen* ‘repays, requites’.

As stated above, *ad* and *aith*, as well as *in* and *ind*, and *es* and *us*, discussed in the next subsection, are neutralised to *at-* before an infixed pronoun.

4.2.2.6. The preverbs *es* and *us*

The following table shows the allomorphy of the preverbs *es* and *us* in Old Irish.

Table 45. Preverb allomorphy in Old Irish: *es* and *us*

Cit.	Prenuclear	Nuclear				Gloss
		Position	Orthography	Phonology	Notes	
es	*as-, at-*	_∅	*·es-*	·∅′as-		‘out of, off’
		_R	*·é-*	·∅′a∅′-		
		_C	*·e-*	·∅′a^{G}-		
		_?	*·as-*	·∅as-	rare	
us	*as-, at-*	_∅	*·os-*, *·us-*	·∅°əs°-		‘off’
		_R	*·ó-*, *úa-*, *ú-*	·∅°ə∅°-		
		_C	*·o-*, *·u-*	·∅°ə^{G}-		

The preverbs *es* and *us* both appear as *as·* in prenuclear position. When under the stress, *es* behaves similarly to *ad*. It appears as *es* before vowels and as *é* before sonorants, e.g. *eséirge* (Wb18b5), verbal noun to *as·éirig* ‘rises again, is resurrected’; *ællned* (Sg55b11; Wb8d6), verbal noun to *as·léna* ‘pollutes, defiles’; *do·élai* ‘escapes’, built on *as·luí* ‘escapes’; *érchoiliud* (Ml22c3),[206] verbal noun to *as·rochoíli* (Ml35d22) ‘defines, determines’. Before other consonants, the form is typically *e*, geminating, e.g. *etech*, verbal noun to *as·toing* ‘refuses’; *ni·epil* (Wb30d14) beside *at·bail* (Wb4d5) ‘dies’; *ni·epir* (Wb25d4) beside *as·beir* (Wb4d23) ‘says’. Later, the form *·es-* could be used instead in all contexts. For a relatively small number of verbs, the form *·as-* appears rather than *·es-*, e.g. *·aisndet* (Ml54a20), compared to *ass·indet* (Ml95d3) ‘declares,

[206] The example is dative singular, but as a u-stem noun, this is identical to the nominative singular.

relates'; *ní·aspena* (Ml39b6) in contrast to *as·fena* 'attests, swears'; perhaps exceptionally *ní·asóircc* (Wb11a11) as the prototonic form of *as·oirc* 'cuts down. There does not appear to be any clear conditioning to this variation, so the few forms that show it must be lexically marked.

The preverb *us*[207] appears as *as·* in prenuclear position. Pedersen lists it rather as *od* (VGKii, 451ff.), but McCone (1987) lists it as *uss* and Thurneysen (*GOI*: §849) instead lists both *oss* and *uss*. However, the behaviour of other preverbs which precede it clearly points towards an underlying /ə/, e.g. *fursunud*, verbal noun of *for·osna* 'lights up', reflecting *for-us-es-and*; and *cumscugud* and *ni·cumscaigther* (Sg23a4), verbal noun and present passive singular respectively of *con·oscaigi* 'moves, changes', from *com-us-scoich-*; *cumtach*, verbal noun of *con·utaing* 'builds, constructs', reflecting *com-us-ding*. As this preverb occupies a low position in McCone's hierarchy of preverbs, there are not many examples in which prototonic forms give direct evidence for its behaviour under the stress, and this must largely rather be inferred from the deuterotonic forms of verbs in which it is the second preverb.

Before vowels, I am not aware of any unambiguous examples with *·us-*, but there are a number with *·os-*, e.g. *con·osna*, from *com-us-ess-an*; *as·oilci* and *ar·osailci*, both meaning 'opens', and seemingly reflecting *us-léic* and *ar-us-es-léic* respectively (VGK: 563). Before sonorants, *us* generally appears as *·ó-*, or *·úa-*, e.g. *do·fúarat* 'remains (over)', from *dí-us-reth*; *con·úala* 'ascends, goes up', from *com-us-lu*; *do·inóla* 'gathers, collects', from *to-in-us-la*. Thurneysen also lists an example with *·ú-*, i.e. *únach* 'washing off', from the combination of *us-* with *nigid* 'washes'. Before other consonants, the most common form is *·o-*, geminating, e.g. *·opaind* and *opad*, prototonic form and verbal noun respectively of *as·boind* 'refuses'; *do·oggell* 'purchases', reflecting *dí-us-gell*;[208] *in·otat* 'enters into', reflecting *in-us-tét*; *con·oscaigi* 'moves, changes', from *com-us-scoich*. There are also examples with *·u-*, e.g. *do·fuisli* 'slips, stumbles' and *do·fuisim* 'pours out, pours forth' from *to-uss-sel* and *to-us-sem* respectively;[209] *con·utaing* 'builds, constructs' and *ar·utaing* 'builds up, restores' from *com-us-ding* and *ar-us-ding* respectively.

[207] Pedersen (VGKii: 299) lists this preverb instead as *od*.
[208] The original low vowel of this root being confirmed by *forgell*, verbal noun of *for·gella* 'testifies, attests' and *comgellad* 'act of promising, conspiracy', verbal noun of *con·gella*.
[209] Both with non-historic *f-*.

4.2.2.7. The preverbs *dí* and *to*

The following table shows the allomorphy of the preverbs *dí* and *to* in Old Irish.

Table 46. Preverb allomorphy in Old Irish: *dí* and *to*

Cit.	Prenuclear	Nuclear				Gloss
		Position	Orthography	Phonology	Notes	
dí	*do·, du·*	_∅, _C	*·dí*	·d′ə∅′^{L}-		‘of, from’
		_ro	*·d′a-*	·d′a^{L}-		
to	*do·, du·*	_∅	*·t-*	·t̃-		‘to, towards’
		_C	*·to-, ·tu-*	·t°ə^{L}-[210]		
		_C	*·ta-*	·ta^{L}-	rare	

The preverb *dí* is neutralised to *do·* or *du·* in prenuclear position (see below), but under the stress generally takes the form *·dí-*, leniting. There is also a byform *·de-*, which appears before *-ro-*. Variants with a short vowel are also found in the prototonic forms of *do·gní* ‘does, makes’, e.g. *ni·dénat* ‘they do not do, make’ (Wb12b20) and in the suppletive resultative forms of *téit* and its compounds. This may be seen by contrasting the resultative third person singular of *téit* ‘goes’, i.e. *do·coid* (Wb21a12, i.e. *dí-com-fed*), with the resultative third person singular of *do·tét*, i.e. *do·dechuid* (Ml16c5, i.e. *to-dí-com-fed*). Apart from before *ro-* and in these exceptions, *dí-* is found consistently, both before consonants – contrast *do·bádi* ‘drowns, extinguishes’ with *ar·díbdai* ‘quenches, destroys’ – and before vowels, e.g. *do·fed* ‘leads, escorts’ vis à vis *do·diat* ‘leads down’, with vowels in hiatus after the lenition of the initial <f> of the root.

Like *dí*, the preverb *to* is neutralised to either *do-* or *du-* in prenuclear position.[211] This variation in spelling is found also for the preverbs *fo-* and *ro-* and the dummy preverb *no-*, all of which show sometimes <o> and sometimes <u> in this position. Stifter (2014: 213f.) points out that the spellings *du·*, *nu·* and *ru·* are significantly more common than the spellings *do·*, *no·*, and *ro·* after a preceding particle, such as *má-* ‘if’, and suggests that this is due to them being in weakly stressed position after the particle.

I suggest that the variation in spelling for these forms might be due to the fact that they have somewhat particular status in the Old Irish phonological system, in that

[210] Exceptionally, also /ta-/ is found (see below).
[211] Forms with <t> rather than <d> are also found in earlier sources.

they consist of only a consonant and a vowel, but are not subject to the rule of abstract consonant excrescence which lengthens XV- constellations in the nuclear constituent (see 3.3.2.3). That being the case, if the representations /d˚ə/, /R˚ə/, /N˚ə/ and /φ˚ə/ are assumed for *do·*, *ro·*, *no·* and *fo·* respectively, a certain fluctuation in spelling might be expected.

A further phenomenon is relevant to the preverbs *to*, *fo* and *ro*. Before a nuclear constituent beginning with a vowel, compound verbs with these preverbs frequently appear as prototonic even when independent. The vowel is elided and the initial consonant falls under the primary stress, thus dissolving the prenuclear constituent (McCone 1987: 3). For example, in the Milan glosses, *do·esta* 'is absent', is variously spelled as *do·esta* (Ml35d20), as *du·esta* (Ml71c19), and as *testa* (Ml65d6). Similar variation, with rather more examples, can be found in the same corpus for *do·uic* 'brought', the third person singular suppletive perfect of *do·beir* 'gives'.

There are not many verbs in which *ro* is a true preverb, although it is widely used as a resultative or potential marker, but that this tendency is true for *ro* as much as for *to* is readily apparent from the various forms of *ro·icc* 'comes' in the Würzburg glosses. It becomes increasingly common as time goes on: for *fo·álgi* 'lays low, throws down', deuterotonic forms are found in the glosses for the present first person singular (*fo·algim* in Sg146b14) and second person singular (*fu·falgi*[212] in Ml108c12) but the prototonic form is the only one attested in the present tense in the later language, e.g. present third person singular *falgai* (LU8353). Many of these compounds come to be treated as simple verbs in Middle Irish.

When *to* occurs under the stress, there is variation between *·to-* and *·tu-*. From the examples I have gathered, this variation appears to be conditioned by the vocalism of the original stressed syllable of the nuclear constituent. Where the stressed vowel of the deuterotonic is /a/, the preverb is generally *to-*, leniting, whereas when the stressed syllable of the deuterotonic form is /ə/ the preverb typically appears rather as *tu-*, leniting.

When a compound verb has more than one preverb, there is a strong tendency for *to* to appear as the first preverb, according to the positional hierarchy established by McCone (1987: 90). This means that it is practically impossible to test this generalisa-

[212] With non-historical <f> (see below).

tion for deuterotonic verbs for which *to* is the second preverb. There are however, numerous verbs with *to* as first preverb, meaning that it is not difficult to find deuterotonic-prototonic pairs.

For the spelling *·to-*, i.e. /t°a-/, the following examples are illustrative before i-colour, a-colour and u-colour respectively: *du·scéulai* (Ml68d12), but *ni·toscelai* (Thes.ii 35.56); *do·chaithi* 'which spends' (Thes.ii 33.22), but *nachi·tochthad* 'let him not wear you out' (Wb31d11); *do·boing* 'he plucks, wrests', but *ni·tobuing* 'he does not pluck, wrest' (both Laws i 86n).[213] Examples before a high vowel are somewhat fewer, but there are a number of instances with original /·C′ə-/, e.g. *ní·tuilli* (Laws 5: 348.8) from *do·slí* 'deserves' (Laws i 242.1); *nís·tuirmi* (Wb30c17) from *do·rími* 'enumerates' (Ml44c28). By and large, this principle holds for the formation of the imperative forms and the verbal noun as well.

Many of the comments made about *to* in this subsection are similarly valid for *fo*, *ro*, and *no*, discussed in the next subsection.

4.2.2.8. The preverbs *fo*, *ro* and *no*

The following table shows the allomorphy which may be observed for the preverbs *fo*, *ro*, and *no* in Old Irish.

Table 47. Preverb allomorphy in Old Irish: *fo*, *ro*, and *no*

Cit.	Prenuclear	Nuclear				Gloss
		Position	Orthography	Phonology	Notes	
fo	*fo·, fu·*	_∅	*·fá-*	·φa∅-		
		_∅°	*·fó-*, *·fúa-*	·φ°a∅-		'under'
		_∅′	*·foí-*	·φ°a∅′-		
		_C	*·fo-*, *·fu-*	·φ°ə^{L}-[214]		
ro	*ro·, ru·*	_∅	*·r-*	·R˜-		
		_∅°əs°	*·ró-*	·R°a∅°-		grammatical[215]
		_C	*·ro-*, *·ru-*[216]	·R°ə^{L}-		
no	*no·, nu·*					grammatical[217]

[213] A possible exception here is *ni·toicnebu* from *do·cin* 'fasts' (ZCP 13 276.4).
[214] Exceptionally, also /φa-/ is found (see below).
[215] Used primarily as a resultative or potential marker, only very occasionally as an ordinary preverb.
[216] Exceptionally, also /Ra-/ is found (see below).
[217] Used as a dummy particle to host infix pronouns, or in verbal tenses which require a prenuclear constituent, e.g. imperfect, conditional etc.

The complementary distribution seen in the allophones of *to* can also be observed for *fo*. For the context with original /a/, the pretonic form is generally *·fo-*, e.g. present third person singular deuterotonic *fo·fera* 'provides' (Wb2a17) against prototonic third person plural *ni·foíret* (Wb27d24);[218] present second person singular *fo·daimi* 'you suffer' (Ml55d11), but *cid-ar-a·fodmai* 'why then do you suffer' (Ml55d11);[219] third person singular present subjunctive *fo·crothad* 'that he should shake' (Ml64a6), but second person singular present *in-ní-na·forchrothai* 'is it that you do not shake?' (Ml64a4). For the context with original /ə/ fewer examples are available, but it is sufficient to cite *imm·fuirig* 'delays, hinders' and *ar·fuirig* 'holds back, restrains', both compounds of *fo·rig* 'holds back, delays', as well as the verbal nouns *fuillem*, from *fo·slí* 'earns, incurs liability', and *fuillned* from *fo·lína* 'fills up, supplies'.

There are seemingly rather more exceptions to this generalisation for *fo-* than for *to-*, although some of the examples are somewhat ambiguous. One clear exception is *fo·loing* 'supports' (Wb29d17), with prototonic *·fulaing* (Ml77d3).[220] A converse counterexample is *fo·lugai* 'covers, conceals', with verbal noun *folach*.[221] More dubious counterexamples include *fo·guid* 'begs, entreats' which has the verbal noun *foigne*, although, perhaps unsurprisingly given its semantics, the only prototonic examples in DIL are from the subjunctive, where a low vowel might be expected (see section 6.2 below). The verbal noun of *fo·gní* 'serves' is *fognam*, with a low vowel, but all the prototonic examples have a-colour after the preverb, in which position the distinction between /ə/ and /a/ is neutralised anyway.

This conditioned distribution of /ə/ and /a/ for *fo* under the stress does not extend to the context before an abstract consonant, i.e. orthographically vowel-initial. Here, *fo* combines with /-∅′-/ to give *·foí*, with /-∅°-/ to give *·fó-* or *·fúa-*, and with initial /-∅-/ to give *·fá-*. Of these, the first is compatible with underlying /φ°a-/, while the second has unexpected /-∅-/ for /-∅°-/ and the third cannot be derived from the synchronic phonology.

[218] Similarly in the compounds *con·foíra* and *remi·foíra*.
[219] Contrast here the high vowel in third person singular future *fon·didmae* (Ml35c33), maintained in prototonic *ni·fuidema* (Ml56c9).
[220] This may be contrasted with the expected vocalism in *im·folngi* 'produces, sustains' (Wb4d32), although see Le Mair (2011: 222f.) for the historical derivation of this verb.
[221] Also *in·foilgi* 'hides, conceals'.

In a number of cases, the occurrence of one or other form of the preverb in prototonic forms may give clues as to the underlying vowel of the root. This is particularly apparent for the root *ben-* in *do·ben* 'strikes at, taunts', with verbal noun *tuba* or *tubad*, and in *fo·ben* 'strikes, impairs', with the verbal noun *fubae* and the prototonic form *·fuiben*.[222] This suggests underlying /ə/ which is neutralised to /a/ before a-colour in the citation form, and can be contrasted with low vowels in the verbal nouns and prototonic forms of the similarly formed *do·glen* 'clings to' and *fo·tlen* 'takes away, purloins'. Perhaps also with /ə/ are the verbs *do·nessa* 'tramples on, crushes',[223] with the verbal noun *tuinsem*, and *fo·gella* 'pledges, pronounces, declares', with the verbal noun *fugell* and the prototonic stem *·fuigl-*.

In a small number of verbs, *to*, and in one case also *fo*, appear as *·ta-* and *·fa-* when under primary stress. Some of these verbs are particularly common, particularly *do·beir* 'gives', which has the prototonic form *ní·tabair* 'does not give'. The conditioning in such cases is somewhat difficult to establish, but Thurneysen (*GOI*: §82) notes the tendency of *-ro-* to occur as *-ra-* before original **a* and suggests that the same might have occurred in the suppletive perfect of *do·beir*, which occurs as *do·rat* (Wb4b10), but *nícon·tarat* (Ml36a1). The same phenomenon is found in *do·rala*, which is a suppletive verb for *do·cuirethar* 'puts', e.g. *ceta·tarlad* (LL515), and which survives into Modern Irish *tarlaigh* 'to happen'.

However, further examples do not always have the original **a*, and attributing the conditioning to a following *-ro-*, in parallel to the preverb *dí*, which has a byform *·de-* in this position (see above), fails in light of alternations such as those found in *do·scara* 'overthrows, knocks down', with a third person singular imperative form *na-chib·tascrad* 'let him not cast ye down' (Wb22b1) and developing as a simple verb with the root *tascr-*; and *do·srenga* 'pulls', with the verbal noun *tarraing*, developing into a simple verb with the root *tairrng-*. There is also one case of which I am aware, although admittedly with late examples, in which *·fa-* occurs instead of *·fo-*, i.e. *·fagab* as the protonic form of *fo·gaib* 'meets with, discovers'. This question requires further research, but in the absence of any clear conditioning, these cases must be marked here as lexical exceptions.

[222] Also the verb *do·fuiben* 'cuts, lops off'.
[223] The first person singular present indicative form *cot·nessiu* (Ml126c17) would suggest rather /a/, however.

4.2.2.9. Summary

The above subsection gives a flavour of some the difficulties involved in establishing general phonological principles capturing the differences between prototonic and deuterotonic forms. There is considerable variation, and this is presumably not limited to scribal whim or convention either, but rather reflective, at least to some extent, of social, geographical or idiolectal norms. Further research into these alternations, including the collection and careful dating of as many examples as possible, is a clear desideratum.

Some examples illustrating these alternations are given in chapters 5 and 6, which are devoted to Old Irish verbal stem formation and conjugation. However, it still remains to lay out some preliminaries with respect to the composition of the nuclear constituent of the Old Irish verbal phrase. This is carried out in the following section.

4.3. The nuclear constituent

This section discusses the structure of the nuclear constituent of the Old Irish verbal phrase. This constituent must contain a verbal root, and is inflected for the categories of tense, voice, person and number. It may optionally contain one or more preverbs and, much more rarely, may be supplemented by a pronominal suffix. Subsection 4.3.1 discusses the root shapes of Irish verbs and the formation of denominative verbs, while an overview of the formation of the various tense stems follows in 4.3.2. Following this, subsection 4.3.3 lays out the system of person endings used in the conjugation of Old Irish verbs.

4.3.1. Old Irish root shapes and denominative verbs

Primary verbal roots in Old Irish almost always have the root shape X_1V- or X_1VX_2-,[224] where X stands for a segment, as defined in 3.2.1.3. Root shapes of the form X_1V- fall into two categories: hiatus verbs, characterised by vowels in hiatus in some present forms, and nasal presents, which take a nasal consonant after the root vowel to form their present stem. This class, while small, includes some very common verbs, including the hiatus verb *gniid* 'does, makes', with a root /gʹnʹə-/, and the nasal present *benaid* 'strikes' with a root /bʹə-/, taking a nasal infix /-n-/ in the present.

The largest class is, however, composed of verbs with a X_1VX_2- root shape. These divide into strong verbs, whose present third person singular conjunct forms end in a consonant, including verbs such as *beirid* 'carries', *gaibid* 'takes', and *gairid* 'calls', and weak verbs, in which it ends in a vowel. While not original for primary verbs, a number of these had already passed over to the weak flexion by the Old Irish period, e.g. *anaid* 'stays, remains' and *creitid* 'believes, trusts'.[225]

As discussed in subsection 4.1.2, simple verbs are those which do not have any preverbs. These can naturally be extended by preverbs in the way discussed in the previous section, creating compound verbs, i.e. complexes of one or more preverb associated to a verbal root. Naturally, compound verbs are thus often longer than simple verbs. However, given the action of syncope, which regularly deletes every second non-final syllable in Old Irish (see 3.3.2.1), they very rarely have more than two syllables before the addition of person endings in their deuterotonic forms, i.e. a structure of $X_1VX_2VX_3$-.[226] Compound verbs generally have the same inflexion as the simple verbs on which they are built,[227] although there are a few exceptions, principally the compounds of *scaraid* 'separates' and *reithid* 'runs',[228] which are discussed in the relevant sections devoted to stem formation and conjugation in chapter 6.

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[224] There are a very small number of exceptions, such as *aingid* 'saves, protects', which both Pedersen (VGKii: 456) and Thurneysen (*GOI*: §545, §626 etc.), consider to have an underlying $X_1VX_2VX_3$- root structure, *anag*- and *aneg*- respectively.

[225] See Le Mair (2011: 259-73) for a list of all such cases attested in the Würzburg and Milan glosses.

[226] Exceptions include some of the compounds of *reithid* 'runs', e.g. *do·immthiret* 'administers, serves' and *do·etarrat* 'encompasses, comprehends', *do·íarmorat* 'follows, goes after' as well as *do·etarcuirethar* 'intercedes'.

[227] See the discussion by Stump (2001: 120ff.).

[228] Le Mair (2011: 61) identifies a semantic motivation for a number of further exceptions.

Secondary verbs are those formed from nouns or adjectives, or from a primary verbal root. They permit a greater variety of root shapes than primary verbs, particularly in the case of denominatives and deadjectivals. The most extensive treatment of these verbs is by Le Mair (2011), who examines their historical development and synchronic status on the basis of a thorough corpus study of the Würzburg and Milan glosses, and comes up with general principles as to how the semantics of a particular secondary verb govern its assignment to a given inflexional pattern: "A verb becomes AII only if it is transitive and iterative and/or causative. Otherwise it becomes AI." (Le Mair 2011: 100).[229]

Further to the distinction between absolute and conjunct, Old Irish verbs distinguish two different types of flexion: active and deponent. Most simple and compound verbs have active flexion, while a smaller number have deponent flexion. Le Mair (2011: 63f.) convincingly argues that, apart from what she terms *-igidir* verbs, deponent flexion in Old Irish retains Indo-European middle semantics.

This *-igidir* class is numerous, including 179 of the 365 verbs in her corpus (Le Mair 2011: 45ff.). It is also highly productive: "in Old Irish, this is the most productive morphology and has become the default category for creating new verbs" (Le Mair 2011: 101; see also Joseph 1987: 115).

The origin of these formations, which merit a brief discussion, was explored by Joseph (1987). The *-igidir* deponents developed when **sag-ī-* > **haɣi-* was added to the nominative, or sometimes the oblique stem[230] (Jospeph 1987: 115), of a noun or adjective. From a synchronic perspective, this entails the addition of /-əɣ′-/ to a noun or adjective. As McCone (1987: 74) states, the *-igidir* verbs "never lose the vowel of their formative suffix through syncope". A further particularity of these verbs is that the vowel before the third person endings is never syncopated either, "even though the normal rules demand it" (Stifter 2006: 152).

The syncope patterns of *-igidir* verbs are discussed by McCone (1987: 76-7) and examined in detail by Ó Crualaoich (1997). They argue that non-syncope of the penultimate vowel in third person *-igidir* formations results from the grammaticalisation of the divergent syncope patterns in verbal forms with an odd and even number of sylla-

[229] AI and AII are the two main classes of weak verbs defined by Thurneysen (1946).
[230] Joseph (1987: 113f.) examines the formation of *-igidir* verbs from the oblique stem of n-stem nouns and the matter is also discussed by Le Mair (2011: 68f.).

bles (every second, non-final syllable in Old Irish being regularly syncopated, as discussed in 3.3.2.1). This exploitation of different syncope patterns is motivated by the desire to keep the passive and third person deponent formally distinct.

Jasanoff (1997: 152-3), followed by Griffith (1991: 143f.), argues that the passive and third person deponent originally had different preforms, respectively *-*(n)tor* and *-*(n)tro* respectively. This suggests a quite straightforward formal solution for the synchronic status of these formations in Old Irish: the third person deponent endings have a final TR-cluster, e.g. absolute third person singular /-əθ′r′/, the vowel of which is immune to syncope by virtue of being final. Seeing as TR-clusters are illicit in final position in Old Irish, they are resolved by an epenthetic vowel (see 3.3.2.2).

This solution does not, however, solve the fact that the suffix /-əɣ′-/ appears to be immune to syncope. There is nothing in the synchronic phonology of Old Irish, as it is usually described, that would protect from syncope the second vowel of *dánaigedar* (Ml17c17), present third person singular relative of *dánaigidir* 'bestows', from *dán* 'gift'.

One solution to this problem to this would be to posit an extra formative vowel after the base noun or adjective before the suffix, e.g. /da∅nə-əɣ′-/. The regular action of syncope would then delete one or other of these vowels, leaving *-ig-* on the surface in all instances. However, this is quite problematic when the base noun or adjective ends in a surface vowel, e.g. *béo* 'alive', from which third person singular *beoigidir* (Wb13d7) 'vivifies', which would have to be derived via /b′a∅°-ə-əɣ-əθ′r′/.

A more attractive solution is perhaps to suggest that the suffix *-ig-* is specified as {o} on the path of stress, thus being unstressed by definition and never ephemeral (see 3.3.2.1). This would render it immune to the effects of syncope and therefore neatly account for the observed patterns. There is also a certain symmetry to this analysis. The *-ig-* suffix used to derive verbal roots from nouns and adjectives is parallel to preverbs found in the prenuclear constituent from the perspective of stress.

This solution is also plausible from the semantic perspective. If, the widely accepted hypothesis that the suffix is a reflex of *$seh_2\hat{g}$- 'pursue, seek' (Joseph 1987: 155) is true and the original meaning of these verbs was "noun-seeker", then it would not be unreasonable to posit some manner of secondary stress in such a compound. A subsequent loss of this is also well-motivated, given that the semantics had been bleached already by the Old Irish period.

The above paragraphs have laid out the basic structure of the verbal root, and discussed the implications for its extension by preverbs to create compound verbs, as well as discussing the formation of secondary verbs from nouns and adjectives. The next subsection gives an overview of Old Irish stem formation.

4.3.2. An overview of Old Irish verbal classification and stem formation

This subsection examines verbal classification and stem formation in Old Irish. Subsection 4.3.2.1 gives an overview of Old Irish verbal classification, while subsection 4.3.2.2 defends the analysis of weak verbs in this thesis. Subsection 4.3.2.3 looks rather at strong verbs, and in particular at stem changes they exhibit.

4.3.2.1. General verbal classification

Five distinct stem formations can be formed from verbal roots. These are the present stem, the subjunctive stem, the future stem, the preterite active stem and the preterite passive stem. As mentioned in 4.3.1, Old Irish primary verbal roots have two principal patterns shapes: those with an X_1V- root (*GOI*: AIII, BIV, BV; *EIV*: H1, H2, H3, S3) and those with an X_1VX_2- root (*GOI*: AI, AII, BI, BII, BIII; *EIV*: W1, W2, S1, S2). These classifications categorise verbs according to their present stem formation.

With respect to the present stem, two broad categories can be identified. On the one hand there are weak verbs, which are most often secondary, exhibit a variety of root shapes, and whose active third person singular conjunct forms end in a vowel. Weak verbs are quite uniform in the way in which they form the various tense stems, nearly always taking an a-subjunctive, an f-future, and an s-subjunctive. On the other hand, there are strong and hiatus verbs, which are primary and show considerable variety in terms of their stem formation.

Turning to weak verbs first, the conventional classification of these verbs is into two categories, those ending in *-a*, known as a-verbs (*GOI*: AI; *EIV*: W1), and those which end in *-i*, known as i-verbs (*GOI*: AII; *EIV*: W2), identified here with person endings /-ə∅/ and /-ə∅′/ respectively. Apart from the active third person singular conjunct,

the conjugation of these verbs is largely uniform, although semantic differences between the two classes (Le Mair 2011), justify keeping them apart. Weak verbs are discussed further in section 5.1.1.

Strong verbs, i.e. those ending in a consonant in the active present third person singular conjunct, can be divided into those which take a nasal infix to form the present stem, i.e. nasal presents, and those which do not. The latter fall into three main classes: a large group in which the stem-final consonant alternates in terms of its colour according to the person and number of the form (*GOI*: BI; *EIV*: S1a, S1b); a small group in which it consistently has a-colour (*GOI*: BI; *EIV*: S1c); and a somewhat larger group in which it consistently has i-colour (*GOI*: BII; *EIV*: S2). A subgroup of the alternating pattern verbs have a final /-d/ in the conjunct third person singular (*EIV* S1d). These verbs are dealt with in 5.1.2, below.

Nasal presents fall into three principal categories: those in which the nasal infix forming the present stem is infixed before the final consonant of the root (*GOI*: BIII; *EIV*: S1d); those in which the nasal is infixed between a root-final sonorant and the person endings (undefined in either *GOI* or *EIV*); and those in which the nasal is infixed to an XV- root (*EIV* S3), in which case the nasal infix may have either a-colour (*GOI*: BIV); i-colour (one verb: *ro·cluinethar*); or u-colour (*GOI*: BV). These verbs are discussed with in 5.2.3, below.

Hiatus verbs are those verbs whose active present conjunct third person singular ends in a surface long vowel or diphthong, i.e. a stressed combination of short vowel plus abstract consonant. The name comes from the fact that in certain forms, such as the absolute third person singular, they show vowels in hiatus, e.g. *ciid* ‘weeps’, compared to conjunct *·cí*. The internal categorisation of this group is a matter of some difficulty, given the fact that they show great variability in terms of their stem formation, and quite uneven attestation. These verbs are discussed in 5.1.4.

The following subsection defends the analysis of weak verbs put forward in this work, as this class has not always been dealt with in a explicit manner in studies of the Old Irish verbal system. In this work, it is argued that weak verbs generally have XVX- roots, like strong verbs, and that their main particularity, apart from the uniform fashion in which they form their subjunctive, future, and preterite stems, is that they have endings with vowels in the active third person singular conjunct.

4.3.2.2. The analysis of weak verbs

The analysis of weak verbs put forward here requires some justification, as it is a departure from the traditional analysis. As explained above, these verbs have a present third person singular conjunct form ending in a vowel, in contrast to the strong verbs, in which it ends in a consonant, e.g. weak *ní·marba* 'does not kill', but strong *ní·beir* 'does not carry'. It is not immediately obvious whether this final vowel should be considered a property of the root, or a property of the present stem (i.e. a present stem infix), or a different ending.

Evidence against the vowel being a property of the root comes from a different stem formation and a different class of verbs. In the s-preterite of hiatus verbs, the third person forms are clearly disyllabic, this being confirmed by metre. For example, for the verb *bruid* 'smashes', the preterite third person singular appears as *bruis* /b˚r˚ə∅′əs′/ (Fél Apr. 4)[231] with a disyllabic reading confirmed by the metre of the poem. Similarly, for *luid* 'moves', the spelling *luis* is ambiguous between a monosyllabic and disyllabic reading, but later glosses have *luadhis* or *luidhis*, which are clearly disyllabic, this presumably also being the case for *taeiss* (TBC6024), from *do·soí* 'turns'.

The significance of these forms is that, being disyllabic, they confirm that the formative of the s-preterite begins with a vowel, and indeed that it most likely has the form /-əs-/. If this is the case, then the weak verb roots must be analysed as being consonant final, as the addition of a vowel-initial formative to a vowel-final root, would leave a vowel after syncope, e.g. for the absolute third person plural of *caraid* 'loves', we would expect /karə-əs-əd′/ → /karəsəd′/, spelled ***carasait*. The form which occurs is rather *carsait* (Fél Mar 15), which points clearly to a consonant-final root, with the derivation /kar-əs-əd′/ → /karsəd′/.

If the roots of the weak verbs in question are fundamentally consonant final, i.e. of the structure XVX-, it remains to determine whether the present tense stem should be analysed as having a vowel infix, parallel to the nasal infixes which also occur in the present, or if the vowel of the present third person singular conjunct is rather a person ending. Based on the behaviour of these verbs with respect to other person endings, it is

[231] With a variety of spellings in the source manuscripts.

argued in 4.3.3 below, and in more detail in the introduction to 5.1.1, that the latter solution gives a better fit to the data.

While weak verbs nearly always take an a-subjunctive, an f-future and an s-preterite, it should be noted that the behaviour of i-verbs and a-verbs differs somewhat within those categories, and that weak verbs also show particularities with respect to strong verbs which also take these formations. As regards the a-subjunctive, weak verbs with root-final i-colour retain the i-colour in this conjugation, whereas strong verbs with root-final i-colour show a change to a-colour in this stem formation.

A disadvantage of this analysis is that it makes the analysis of the a-subjunctive as a unitary class somewhat more difficult. If the weak verbs were considered to have a disyllabic root, or to take a vowel infix in the subjunctive stem, then one could set up an a-colour abstract consonant infix /-∅-/ characterising all a-subjunctives. Such a formative would account neatly for strong verbs, such as *gaibid* 'takes', whose present stems end in an i-colour consonant, but whose subjunctive stems end in an a-colour one, i.e. *gabaid*. Weak verbs, were they to have a vowel final root or subjunctive stem, could be considered to take the same formative, which would be deleted by syncope, e.g. present *caraid* 'loves', with the morpheme structure /karə-əθ′/, and subjunctive *caraid*, with the morpheme structure /karə-∅-əθ′/.

4.3.2.3. Stem changes in strong verbs

The choice of considering weak verbs to have rather the root structure XVX-, thus has consequences for the analysis of strong verbs as well. These must be considered to undergo changes in the colour of their root consonants across the various stems, changes which can not be handled at the level of conjugation, but rather in a more holistic fashion, as a series of templates associated to the different stem formations.

As regards these other stem formations, it is perhaps time to discuss the main patterns to be observed. In some cases, the phonological form of a root gives a good indication of how each of the stems are formed from it, but there are numerous exceptions, and it is not uncommon that two very similar roots show differences in stem formation. Where dependencies can be observed, these are pointed out in the relevant sec-

tions of chapter 6 below, but an overview of the subjunctive, future and preterite stems is put forward in the following paragraphs.

In the subjunctive stem, there are two main patterns: an s-subjunctive and an a-subjunctive. With very few exceptions, the affiliation of a verb to each of these patterns is entirely regular. Strong verbs whose roots end in a dental or velar obstruent take the s-subjunctive, whereas all other verbs take the a-subjunctive. The former pattern is characterised by the final consonant of the root being transformed to /-s-/, while the latter involves a change in the colour of the final consonant of the stem to a-colour (in some cases alongside other changes, discussed below) and the lowering of the vowel of the root. The two patterns also show systematic differences in terms of the person endings they take, discussed in 4.3.3 below. The conjugation of the s-subjunctive is discussed in 6.1.1, and that of the a-subjunctive in 6.1.2.

In the future, the vast majority of weak verbs, alongside a small number of strong verbs, take an f-future, the stem of which can be considered to be formed by the addition of either /-∅ˈəφ-/ or alternatively just /-əφ-/ to the root. Strong verbs typically formed their futures by reduplication of the subjunctive stem, although this not always recoverable synchronically. Future stems resulting from reduplication of an s-subjuctive stem are conjugated differently from those resulting from reduplication of an a-subjunctive stem, in line with the different conjugational properties of the s- and a-subjunctives respectively. Furthermore, some verbs have an ē-future, which although historically derived from reduplication of some a-subjunctive stems has become productive and been extended to verbs in which it is not historically regular. There are also a number of cases in which no reduplication occurs, and some irregular formations. The conjugation of the f-future is discussed in 6.2.1, while the various reduplicated formations are covered in 6.2.2, and the ē-future in 6.2.3.

As regards the preterite active stem (henceforth just the preterite stem), weak verbs, as well as a few hiatus and strong verbs, take an s-preterite, characterised by the addition of /-əs/ to the root. The most frequent pattern of preterite stem formation for strong verbs is reduplication, although there is more variety in preterite reduplicated templates than is found in the future. There are two further patterns of preterite stem formation for strong verbs. The vast majority of those whose root ends in a sonorant, as well as those whose root ends in /-µ/, and some of those whose root ends in /-ɣ/, have a t-preterite, characterised by the addition of /-t-/ to the root. A number of strong verbs

also take an ā-preterite, which is characterised by stem-initial and stem-final a-colour. The conjugation of the s-preterite is discussed in 6.3.1, the t-preterite in 6.3.2, the ā-preterite in 6.3.3, and the various reduplicated formations in 6.3.4.

A number of the patterns outlined above involve chromatic templates, whereby, given a root structure X_1VX_2-, X_2, and often also X_1, exhibit alternations in colour, while V is often extended by an abstract consonant. This is particularly evident in the ē-future, which enforces the template /X′a∅°X-/, and in the ā-preterite, which has the template /Xa∅X-/. So, for example, the weak verb *gataid* 'takes away', which has gone over to the productive ē-future, has the root /gad-/, which is modified to /g′a∅°d-/ in the future. For the ā-preterite, the strong verb *reithid* 'runs', which has the root /R′aθ-/, sees this modified rather to /Ra∅θ-/ in the preterite.

Similar alternations can be observed in the subjunctive, where the a-subjunctive enforces stem-final a-colour for strong verbs with XVX- roots, e.g. present *gaibid* 'takes', with i-colour, but subjunctive *gabaid*, with a-colour. Furthermore, a number of verbs with initial a-colour or u-colour in the present show instead initial i-colour in the subjunctive. One example is *guidid* 'prays, asks', which has the root /g°əð′-/, modified instead to /g′as-/ to form the s-subjunctive. Similarly with the a-subjunctive is *do·moinethar* 'supposes', with the root /m°an′-/, which has the a-subjunctive form *do·menathar*, with the stem /m′an-/.

The number of verbs which exhibit such alternation in the initial consonant in the subjunctive (and by extension the future and often the preterite too) is not particularly large. Of around one hundred strong verbal roots which are well-attested in Old Irish this type of alternation only occurs in seven. At least four of these have presents with stem-final i-colour: *guidid* 'prays, asks' and its compounds; compounds built on *moin*-, such as *do·moinethar* 'supposes'; *gainithir* 'is born'; and *bruinnid* 'springs forth, flows', as well as its compound *do·bruinn* 'flows, trickles' (*GOI*: §549, §617). A further verb, which is not particularly well attested, *scoichid* 'moves, proceeds' likely also belongs here. In addition to these are two verbs which have nasal presents in which the nasal is added after a root-final sonorant: *at·baill* 'dies' and *marnaid* 'betrays, deceives'. One can also add the hiatus verb *foid* to this group, as to do so renders it largely regular.

In this context it is also worth pointing to *laigid* 'lies', *saidid* 'sits, and *saigid* 'approaches, seeks', which in the present have i-colour stem-initial consonants and a-

colour stem-final ones in some forms, and the reverse situation of a-colour stem-initial consonants and i-colour stem final ones in others. These alternations are conditioned by the usual alternation in the colour of the stem-final consonant in the alternating pattern of strong verbs: in cases in which the alternating pattern demands a-colour, these verbs have stem-initial i-colour, and vice versa. In the subjunctive, they have i-colour initials throughout. This particular alternation is discussed further in 5.1.2, below.

This concludes this overview of Old Irish stem formation and templates. The next section discusses the person endings which are added on to these stems to give actual Old Irish verbal forms.

4.3.3. The person endings

Old Irish verbal conjugation distinguishes three persons in both the singular and plural. Unlike in the nominal system, there is no dual number and verbs do not display differences based on gender. There are three basic patterns of flexion: active, deponent and passive.

As regards the active flexion, there are two basic sets of endings, which are generally termed primary and secondary, although they are not considered to reflect directly the Indo-European primary and secondary endings. The primary endings are used in the present indicative, present subjunctive, and future, as well as in the s-preterite, while the other preterite formations take a different set of endings. There are different primary endings for both absolute and conjunct flexion. Furthermore, there are special relative forms in the absolute flexion for the third person singular and plural and the first person plural.

The secondary endings are used in the imperfect, imperfect subjunctive, and conditional. For those tenses which take the secondary endings, a prenuclear constituent is obligatory, so only the conjunct flexion occurs. Furthermore, the distinction between active and deponent is neutralised for these verbs, the same set of endings being used for both.

With respect to the deponent flexion, it also includes absolute and conjunct endings, although these differ somewhat less than in the active flexion. Furthermore, the absolute relative endings of the deponent flexion are generally isomorphic to the con-

junct endings. As in the active flexion, there are a special set of endings for certain preterite formations.

One must make a distinction also between sigmatic formations, which have a siblant stem formative, and non-sigmatic formations. The sigmatic formations, i.e. the s-subjunctive, s-future, and s-preterite, show particular behaviour in those contexts in which an ending with a non-final dental fricative occurs, i.e. the active second person plural absolute, the deponent second person singular and plural and third person singular, the second person singular and plural secondary endings, and the general forms of the passive. In these cases, the dental fricative of the ending becomes a stop, and the vowel which precedes it is not found. The relevant cases are discussed below.

To the person endings may be added suffix pronouns. These are used only with absolute active flexion and are found most commonly with the substantive verb to express possession (*GOI*: §429-31). The suffix pronouns are on the retreat in the Old Irish period, and are relatively rare in the verbal system outside of this specific context. They form part of the nuclear constituent with respect to stress, thus triggering syncope of a preceding syllable where the conditions for such are met, e.g. present third person singular *erbaid* (Ml14d15) 'entrusts', but present third person singular with masculine third person singular suffix pronoun /-ə∅′/ *eirbthi* (Ml51b12) 'trusts himself'.

The following paragraphs discuss the various sets of person endings, beginning with the active flexion. Discussion thus begins with the basic primary endings, discussed in 4.3.3.1 which show considerable variation, and then moves on to the special preterite endings in 4.3.3.2. The deponent endings are examined next, in 4.3.3.3, including the special preterite deponent endings, after which the secondary endings are considered in 4.3.3.4. The discussion concludes with the endings of the passive in 4.3.3.5.

4.3.3.1. Primary endings

The primary endings are found in the present indicative, the present subjunctive, the future, and the s-preterite. They show some variation, particularly in the singular. For the first and second persons singular one can broadly contrast the present and the sigmatic formations (s-subjunctive, s-future, and s-preterite) on the one hand, with the asigmatic formations (a-subjunctive, a-future, ē-future, and to a large extent f-future) on

the other. In the third person singular, it is rather the present and asigmatic formations which fall together in the absolute, although not in the conjunct, while the sigmatic formations have different endings to either. In the singular, the t-preterite generally takes the primary endings too, although in the plural it takes rather the preterite endings. In the plural, the primary endings of the formations discussed here are, unlike in the singular, quite uniform.

The most common absolute *first person singular* ending is /-ə∅˚/, which is found throughout the present and the sigmatic formations. Given the fact that it typically co-occurs with preceding u-colour, one might in fact posit rather /-∅˚ə∅˚/ instead in some instances, although I have not written this in chapters 5 and 6 below. In the present, there is some variation, with the ending /-əm′/ also being found (without preceding u-colour), although more frequently in some present patterns than others, as discussed below in the relevant sections of chapter 5. The ending /-a∅˚/ is very occasionally found instead of the usual /-ə∅˚/, always after <o> in the preceding syllable. The asigmatic formations take rather the ending /-a∅/.

In the conjunct first person singular, the most common ending is /-∅˚/. This is used in the present with most patterns of strong verbs, although /-əm′/ is also found there, as in the absolute. In weak verbs, examined in 5.1.1, and in the i-colour pattern of present tense strong verbs, discussed in 5.1.2.3, the absolute ending /-ə∅˚/ is found also in the conjunct. The sigmatic formations regularly have the usual ending /-∅˚/, as do the f-future and the t-preterite. This ending is also found in the a-subjunctive and a-future after vowels, while for forms of the a-subjunctive and a-preterite with a final consonant, the bare stem, /-/, suffices instead.

The *second person singular* shows less variation than the first person singular. The basic ending for the absolute is /-ə∅′/, found in the present and in the sigmatic formations. This is also found for the conjunct in the present of all weak verbs and a number of categories of strong verbs, including those which do not take the dominant alternating pattern (i.e. 5.1.2.2 and 5.1.2.3) and some nasal presents (5.1.3). However, the conjunct ending for many present formations, and also for the sigmatic formations and the t-preterite, is /-∅′/. The asigmatic formations, in contrast, have rather the ending /-a∅′/ in both absolute and conjunct.

The most common ending for the absolute *third person singular* is indiscutably /-əθ′/, often written <id>, used throughout the present and the asigmatic formations. The

sigmatic formations could be considered to take the same ending, with vowel loss between their characteristic /-s-/ and the consonant of the ending, but they might equally be more straightforwardly considered to have the ending /-∅′/, or, in the case of the s-subjunctive, as having a zero ending. The same applies to the t-preterite.

In the conjunct, there is considerable variation. The bare stem, /-/ is frequent in the present, as is the i-colour ending /-∅′/. In a small number of strong verbs, discussed in 5.1.2, and in the t-preterite (see 6.3.2), the third person singular conjunct always ends in an a-colour coronal stop. As regards the weak verbs, the ending /-ə∅′/ is used for the i-verbs, while /-ə∅/ is the ending for the a-verbs (5.1.1), as well as for the asigmatic formations in the subjunctive. The sigmatic formations, on the other hand, form their third person singular conjunct by deleting their characteristic /-s-/ formative and most often also the specification which precedes it, as discussed in the relevant sections (6.1.1, 6.2.2, 6.3.1).

The absolute relative ending is regularly /-əs/, but /-a∅′/ is used after a coronal stop. When the stem ends in /-s′/, the ending is simply /-∅/, converting this to a-colour. There are also a number of curious forms, which are not widespread, e.g. the present forms of a number of common hiatus verbs, discussed further in 5.1.4.

The absolute *first person plura*l primary ending is disyllabic /-əm′ə∅′/, while the relative is /-əm′a∅′/. In verb forms based on monosyllabic roots, and with *-igidir* verbs, the first vowel of these endings is usually syncopated, but that the basic ending is disyllabic can be seen when the root is a denominative or deadjectival verb with a disyllabic root, in which case the vowel is generally retained. This is also the case when a stem formative is added to a verb with a monosyllabic root, as occurs for example in the f-future, discussed in 6.2.1. The first person plural conjunct ending is /-əμ/ and I am not aware of any variation.

The *second person plural* absolute ending is comparatively rare in the surviving sources, and is unattested for many stem formations. For the most part, the evidence seems to be compatible with either an ending that could be either monosyllabic /-θ′a∅′/ or disyllabic /-əθ′a∅′/. However, it seems more straightforward to derive the penultimate vowel of present subjunctive *chomallaide* (Ml95c3), from *comalnaithir* ‘fulfils’, from epenthesis. For this reason, I have followed McCone (1987: 65) in favouring the disyllabic ending. The ending after sigmatic forms is /-t′a∅′/, although this must be largely assumed from the evidence of isomorphic endings such as the passive imperfect

in my dataset. The reduplicated future *gigeste* (Wb14c2) from *guidid* 'prays, asks' is compatible with this ending, although one might expect syncope of the second vowel. The ending of the second person plural conjunct is identical to that of the third person singular absolute, i.e. /-əθʹ/.

The absolute *third person plural* primary ending is /-ədʹ/, while the conjunct ending is /-əd/. While it might be possible to derive the attested forms of the relative from a monosyllabic form, it seems more straightforward to consider it to be disyllabic /-ədʹa∅ʹ/, in parallel to the first person plural relative and the second person plural absolute.

4.3.3.2. Preterite endings

Three distinct preterite formations, namely the t-preterite, the ā-preterite, and the reduplicated preterite, discussed further in 6.3.2, 6.3.3, and 6.3.4, respectively, take a different set of endings. While the t-preterite largely conforms to the primary endings in the singular, in the plural it rather agrees with the other two preterite formations mentioned above. Characteristic of these three preterite formations is the fact that the customary distinction between absolute and conjunct flexion is largely absent. Apart from in the third person singular of the t-preterite, the same endings are usually used for both. For this reason, I have not seen fit to subdivide the endings according to person and number, but rather discuss first the singular endings, then the plural ones.

As mentioned above, the t-preterite takes the primary endings in the singular. For the ā-preterite and the reduplicated preterite on the other hand, the *first person singular* and the *second person singular* are represented by the bare stem, /-/, without any ending. The exponence of the *third person singular* is generally i-colour, represented here with the ending /-∅ʹ/, although there is at least one possible exception in the reduplicated preterite in which the bare stem, /-/, is used instead. This is discussed further in the relevant subsection, i.e. 6.3.4.

In the plural, the t-preterite, the ā-preterite, and the reduplicated preterite share the same set of endings. The *second person plural* ending is, /-əθʹ/, which is the usual conjunct second person plural primary ending. For the *first and third persons plural* it is somewhat difficult to establish unitary endings. By and large, the data are compatible

with the endings /-əmr/ for the first person plural and /-ədr/ for the third person plural, although it seems necessary to posit at least the byform /-mər/ for the first person plural and probably also that /-dər/ for the third person plural to account for the vocalism of a number of forms. Although this is clearly undesirable, the data seem to warrant it: McCone's (1987: 72f.) straightforward listing of disyllabic endings here fails to account for a number of attested forms, which with disyllabic endings would be exceptionally resistant to syncope. Specific examples are discussed further in the relevant sections of 6.3.3 and 6.3.4.

4.3.3.3. Deponent endings

In the second person plural the deponent has the same endings as the active, already discussed above. However, for other persons the endings differ, although some similarity can be discerned. As there is not too much variety to be observed in the deponent endings, I have divided the examples only into singular and plural.

The *first person singular* deponent ending is most frequently /-ər°/, for both absolute and conjunct, although the asigmatic formations take rather the ending /-ər/. The *second person singular* ending is /-əθʹər/, /-ər/ in sigmatic forms, similarly with no observable difference between absolute and conjunct flexion. For the *third person singular*, the absolute ending is /-əθʹrʹ/, while that of both the relative and the conjunct is /-əθr/. In sigmatic forms the endings /-tʹrʹ/ and /-tr/ respectively are found.

The justification for setting up separate endings for the sigmatic forms, rather than just postulating a rule of vowel loss between dental fricatives is that for the purposes of syncope the endings appear not to have vowels in the first place. Hence, one finds the preterite third person singular form *ro·mmolastar* (Ml126b16), from *molaid* 'praises', without syncope of the second vowel. This clearly suggests that this vowel is underlyingly final, as otherwise there is no reason why it might not be syncopated. Similarly, a trisyllabic reading of the third person singular reduplicated future form *con·miastar* (Strachan 1904: 195.6), from *con·midethar* 'adjudge, determine', is confirmed by the metre. There is no reason why hiatus would be maintained in this form if the ending included an underlying vowel, as it would be regularly reduced by syncope. The final consonant cluster of all these third person singular deponent endings is regu-

larly broken up by an epenthetic vowel, as Old Irish does not permit final obstruent-sonorant clusters. However, the lack of syncope of the penultimate surface vowel, which is retained (except of course in the sigmatic forms), justifies these representations. This has already been discussed in 5.3.1, above.

Deponent verbs in the ā-preterite and reduplicated preterite exhibit a different set of endings to deponent verbs in other stem formations. In the plural they take the normal deponent endings, but in the singular they differ. The ending for the first and second persons singular, both absolute and conjunct, is /-r/, while the ending for the third person singular, absolute and conjunct, is /-rʹ/. The representation of these endings as lacking vowels rests on the same logic as put forth for the ordinary third person singular deponent: syncope of the penultimate surface vowel systematically fails to occur (see Cowgill 1983; Griffith 2009).

The identification of the deponent *first person plural* suffers from similar difficulties to those discussed for the preterite plural forms above. In parallel to the third person singular, the absolute ending /-əmʹrʹ/ and the corresponding relative and conjunct ending /-əmr/ account for the consistently disyllabic surface forms of the ending for a majority of verbs. However, the *-igidir* verbs show different behaviour, e.g. present *dechrigmir* (Ml117b9), from *dechraigidir* ‘is scattered’, and s-preterite *·feidligsemmar* (Ml105a4) from *feidligidir* ‘abides’. Examples such as these suggest disyllabic endings, absolute /-əmʹərʹ/ and relative and conjunct /-əmər/, in which the first of the two syllables is regularly syncopated in the present, but retained in forms in which it is preceded by a stem formative which include a vowel, such as that of s-preterite above, as in these cases it does not fall in a position vulnerable to syncope.

The *third person plural* endings are a great deal more straightforward, and absolute /-ədʹrʹ/ and relative and conjunct /-ədr/, on the model of the third person singular, cleanly capture the observed vocalism.

4.3.3.4. Secondary endings

The secondary endings are used with the imperfect, the imperfect subjunctive and the conditional. These are tenses which require a prenuclear constitutent, so there is no dis-

tinction between absolute and conjunct: only conjunct endings occur. The examples below are divided into singular and plural.

The *first person singular* secondary ending is regularly /-əN′/, which is represented orthographically in a variety of ways, most regularly with <nn>, but occasionally with <n> or <nd> instead. The *second person singular* ending is rare, but appears compatible with /-əθa∅/, /-ta∅/ in sigmatic forms. The *third person singular* is the most commonly encountered of the secondary endings and has the form /-əθ/, usually written with <d>, similarly to the third person singular absolute primary ending.

The *first and third person plural* secondary endings are disyllabic /-əm′əs′/ and /-əd′əs′/ respectively. The former is not particularly common, but the latter occurs more frequently and is isomorphic to the third person plural secondary passive ending, discussed below. The *second person plural* secondary ending is /-əθ′a∅′/, /-t′a∅′/ in sigmatic forms, and is identical in form to the general secondary passive ending.

4.3.3.5. Passive endings

The passive does not exhibit a full range of endings for each person and number in Old Irish. There is only a third person plural form and a general form. The latter is used alone for the third person singular, but also with the first and second persons, the logical subject of the passive in these cases being expressed by means of the addition of an infixed pronoun. The passive distinguishes regularly between absolute and conjunct flexion and there are special relative forms. It follows that there are eight passive endings in Old Irish: absolute, relative, conjunct and secondary endings for both the general and the third person plural passive. I have divided the discussion below on this basis, but keeping the secondary endings for the end.

The most common *general* absolute passive ending is /-əθ′ər′/, while that of the relative and conjunct is rather /-əθər/. Truely disyllabic endings of this nature are justifiable on the basis of the frequent syncope of the first vowel of the ending when the circumstances allow, unlike in the deponent third person, discussed above. In sigmatic forms, the endings appear to be reduced to rather /-t′r′/ and /-tr/, to judge by the evidence of future passive conjunct *fu·lilastar* (Ml109b2), from *fo·loing* ‘supports’, and

numerous other forms discussed in 7.2.2, inter alia, where the lack of syncope in the second syllable would be otherwise inexplicable.

Strong verbs have their own set of general passive endings, used in the present and in the s-subjunctive. These endings are i-colour /-r′/ for the absolute and a-colour /-r/ for the conjunct. The justification for the vowelless representations of these forms is that <rr> is frequently found in the general passive of verbs with roots ending in /-r/, e.g. present passive *as·berr* (Wb21c7) from *as·beir* ‘says’. On this understanding, the alternative present passive *as·berar* (Wb3c21) is analogical, with the exceptional ending /-ər/.

The *third person plural* absolute passive ending is most often /-əd′ər′/, while that of the relative and conjunct is /-əd′ər/. However, considerable confusion with the deponent has occured with these endings, and it is necessary to posit the byforms /-əd′r′/ and /ədr/ respectively in order to account for a number of forms.

The general secondary passive ending is /-əθ′a∅′/, which has the same form as the second person plural secondary ending discussed above. That it is similarly reduced to /-t′a∅′/ in sigmatic forms is evidenced by the passive imperfect subjunctive form *atom·anaste* (Wb14c20), from *ad·anaig* ‘escorts’, where one would not expect syncope of the first vowel of the ending were it rather the usual /-əθ′a∅′/. The third person plural passive secondary ending is /-əd′əs′/, which is identical to that of the third person plural secondary ending.

This concludes the discussion of the person endings in Old Irish, and indeed of the general discussion of the verbal system given in this chapter. Section 4.1 gave an overview of the Old Irish verbal system, while 4.2 discussed the prenuclear constituent of the Old Irish verbal phrase and section 4.3 the nuclear constituent. The following chapters present the flexion of the Old Irish verb. Chapter 6 examines the subjunctive, future and preterite stems, while chapter 5, below, looks at the flexion of the present.

Chapter 5: The Old Irish present stem

5.1. Active flexion of the present stem

This chapter and the following one undertake a reanalysis of Old Irish verbal morphology in terms of a vertical vowel system with two members, /a/ and /ə/, and three consonant colours: i-colour, a-colour, and u-colour. It is argued that assuming a phonological system of this nature yields a more elegant and parsimonious description of many facets of Old Irish verbal inflexion. Indeed, with respect to the traditional descriptions, the postulate of a ternary system of consonant colour and a two-member vertical vowel system permits a number of inflectional categories to be merged, and many irregularities to be restated as regular.

A general outline of Old Irish verbal flexion has already been given in section 4.3.2, but the following sections go into greater detail into the stem formation of the Old Irish present stem and the conjugation of Old Irish verbal forms based on it. Two tenses are built from the present stem: the present, which takes the primary person endings; and the imperfect, which takes the secondary person endings, as discussed in subsection 4.3.3.

The distinction of voice is relevant in the present tense, and three patterns of inflexion occur: active, deponent and passive. The active flexion is discussed in this section, while the deponent and passive flexion are examined in 5.2. The distinction between active and deponent is neutralised in the imperfect, where the same person endings are used for verbs which in the present differ in terms of whether they take active or deponent flexion.

The organisation of the material below roughly corresponds to the mainstream classificatory systems used to categorise Old Irish verbs. Section 5.1.1 examines the weak verbs, which have active present third person singular conjunct forms ending in a vowel, and which form a natural class due to their relatively uniform behaviour with respect to the formation of the other stems. Section 5.1.2 looks at the main group of strong verbs, in which the active present third person singular ends in a consonant, generally retained in the other stem formations. Section 5.1.3 concentrates on those strong verbs which take a nasal infix to form the present stem, known as nasal presents, while section 5.1.4 examines the class of hiatus verbs.

5.1.1. Present flexion of weak verbs

A relatively large number of Old Irish verbs, usually termed weak verbs, typically have the root shape XVX- and have an active present third person singular conjunct form ending in a vowel. However, this class also includes a number of other formations, such as denominative and deadjectival verbs, which often have longer roots, including those verbs which take the *-ig* suffix (see subsection 4.3.1). The main distinguishing feature of weak verbs is the uniformity with which they form other stems: with few exceptions they take an a-subjunctive (6.1.2), an f-future (6.2.1) and an s-preterite (6.3.1).[232]

This class includes all secondary verbs, as well as some primary verbs which have gone over to the weak flexion. Thurneysen distinguishes two categories of weak verbs: those for which the active present third person singular conjunct form ends in *-a*, and those for which it ends in *-i*, designating the former AI and the latter AII (*GOI*: §522). McCone identifies the same two classes and terms them W1 and W2 (1987: 27), the latter being further differentiated between a larger group, W2a, with consistent vocalism throughout the different stem formations, and a smaller subclass of causative origin, W2b, "with *u* vocalism in the present stem as a rule versus *o* in the rest".

[232] The exceptions include *gataid* 'takes away', *caraid* 'loves', and the compounds of *scaraid* 'separates', which show elements of strong flexion in other tense stems. These are discussed in the relevant sections of chapter 6.

For this category, McCone cites only *ad·suidi* ‘stops, holds back’, to which can be added *do·lugai* ‘forgives, remits’, *·cuirethar* ‘puts, throws’, and verbs built on it, as well as *in·tuigther* ‘covers, clothes’, for all of which Thurneysen notes subjunctive <o> for present <u> (*GOI*: §607), as well as a smallish number of other verbs, e.g. *guirid* ‘warms, burns’. While the identification of this subclass might be justifiable from the diachronic perspective, it is questionable whether it is particularly useful synchronically.

The alternation described by McCone only really holds when one compares the present indicative and subjunctive, in line with Thurneysen’s statement of the facts. From the examples I have looked at, there are considerably more future forms of these verbs in <u> than in <o>, also in the glosses (pace Le Mair 2011: 189 for *·cuirethar* in particular). The situation regarding the preterite is more mixed, but does not give a clear picture one way or the other. Given the occasional confusion of <u> and <o> in Old Irish (see examples for preverbs in 4.2.2, above), the relative paucity of counterexamples in the form of verbs from this class with <u> vocalism which are not originally causatives, and the generalised lowering of /ə/ to /a/ in the a-subjunctive (see 6.1.2), I have not seen fit to treat this class separately in what follows.

Aside from the examples of weak verbs given below, some other quite important verbs have weak flexion, including *scríbaid* ‘writes’, *do·lega* ‘destroys’, *eter·scara* ‘divides’, *dálid* ‘distributes’, *léicid* ‘lets go’, *ar·osailci* ‘opens’, *rádid* ‘says’, *roithid* ‘causes to run’. While the curious verb *do·goa* ‘chooses’ conjugates like a weak verb in the present, its behaviour with respect to other stem formations aligns it rather with the hiatus verbs (see subsection 5.1.4, below).[233]

The traditional analysis of the weak verbs is that the characteristic vowel found in the third person singular conjunct forms part of the stem. However, it is difficult to reconcile this to the disyllabic primary endings found in the plural. If the stem indeed ended in a vowel, perhaps a vowel infix in parallel to the nasal infixes discussed in section 5.1.3, below, then it would be difficult to explain the existence of disyllabic absolute forms in the first person plural and third person plural relative.

For example, if *techtaid* ‘possesses’ had a present stem /tʹaxtə-/, then one would expect ***techtaimme* after the addition of the disyllabic first person plural relative end-

[233] The same applies to many forms of the equally curious *as·gu(si)* ‘chooses’, formed from the same root.

ing /-əmʹa∅ʹ/, rather than attested *techtmae* (Ml74d4). The same holds for first person plural *báigmi* (Wb2d15) from *bágaid* 'asserts, contends', first person plural relative *césme* (Wb13c7) from *césaid* 'suffers', third person singular relative *astae* (Ml87b12), from *ásaid* 'grows, increases', etc. In weak verbs with disyllabic roots, on the other hand, the first vowel of these plural endings is frequently retained, as it is not vulnerable to syncope, e.g. first person plural *lathrimmi* (Wb8d19) from *láthraid* 'arranges, disposes', built from *láthar* 'arrangement, disposition'.

This being the case, and in light of good evidence for the disyllabic plural endings elsewhere, it seems most straightforward to argue that the present stem of weak verbs is identical to the root. That means that many weak verbs have simple monosyllabic roots of the shape XVX-. The vocalic endings in the active present third person singular conjunct can thus be posited as /-ə∅/ for the a-verbs and /-ə∅ʹ/ for the i-verbs. These endings are anyway in use in the Old Irish verbal system for the third person singular conjunct: the former is used with the a-subjunctive (6.1.2), f-future (6.2.1), a-future (6.2.2), and ē-future (6.2.3), while the latter is occasionally found in the s-preterite (6.3.1).

The two classes traditionally identified as a-verbs and i-verbs (see above) have very similar flexion, and differ only in their third person singular endings. Although semantic differences between the two classes discussed below mean the traditional differentiation into two classes is merited, I have however, dealt with them together in the exposition of the present and imperfect conjugation of weak verbs below. The following tables show examples of the conjugation of weak verbs in the present and imperfect, subdivided for person and number. Such tables are used throughout this chapter and chapter 6, and some introduction is perhaps necessary.

The top half of the table gives information about the verbs used in the examples. The first column gives the citation form of the verb, which in Old Irish is the independent present third person singular. The second column glosses the meaning of the verb, while the third and fourth give its classification according to the *Grammar of Old Irish* (*GOI*: Thurneysen 1946) or the *Early Irish Verb* (*EIV*: McCone 1987). The fifth column gives the root shape of the verb, while the sixth gives information about the stem formation. In those cases in which a given stem is the same as the root, only one form appears in this column. However, in many cases, the root must be modified in some way in order to yield a given tense stem. In these instances, the derivation of the tense stem

has also been given. The first of these tables, below, shows the active first person singular flexion of weak verbs.

Table 48. Active 1st person singular flexion of weak verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
gataid	'takes away'	AI	W1	XVX-	gad-
marbaid	'kills'	AI	W1	XVX-	marβ-
as·lena	'pollutes, defiles'	AI	W1	XVX-	·L′ən-
caraid	'loves'	AI	W1	XVX-	kar-
moídid	'boasts'	AII	W2a	XVX-	m°a∅′d′-
ad·sluindi	'invokes, appeals to'	AII	W2b	XVX-	·s°l°ən′d′-
for·ása	'grows, increases'	AI	W1	XVX-	·∅a∅s-

Absolute				
gad-əm′	→	gadəm′	*gataim*	CA §20
marβ-ə∅°	→	marβ°ə∅°	*marbu*	ZCP13[234]
Conjunct				
·L′ən-əm′	→	·Lanəm′	*as·lenaimm*	Sg54a6
·kar-ə∅°	→	·karə∅°	*no-t·caru*[235]	Fél Ep. 311
·m°a∅′d′-əm′	→	·m°a∅′d′əm′	*no-m·móidim*[236]	Wb14c18
·s°l°ən′d′-ə∅°	→	·s°l°ən′d′ə∅°	*ad·sluindiu*	Fél Ep. 325
Imperfect				
·∅as-əN′	→	·∅asəN′	*for·ássin*	Wb18c5

For the present first person singular active of weak verbs, McCone (1987: 67) lists *-imm* as the ending for a-verbs and *-u* as the ending for the i-verbs, while Stifter lists only *-imm* for the a-verbs (2006: 56) and first *-u*, then *-imm* for i-verbs (2006: 66). Thurneysen treats both classes identically, and lists first *-imm* first and then *-u* for both sets of verbs (*GOI*: §556-7). It is my impression that the latter statement is more reflective of the reality in Old Irish, although a corpus study would be necessary to bear this out.

The principal ending for the present first person singular is thus /-əm′/ for both absolute and conjunct. The other present ending, /-ə∅°/ also occurs. The imperfect ending is /-əN′/, even though the example here is written with <n>, not <nn>.

The first person singular is found considerably more frequently than the second person singular, for which forms are lacking for certain combinations. Examples of the active second person singular flexion of weak verbs is given in the table below.

[234] Thurneysen (1921: 106.5).
[235] With particle /N°ə-/ and 2nd person singular infix pronoun /-d^{L}/.
[236] With particle /N°ə-/ and 1st person singular infix pronoun /-m^{L}/.

Table 49. Active 2nd person singular flexion of weak verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
marbaid	‘kills’	AI	W1	XVX-	marβ-
techtaid	‘has, possesses’	AI	W1	XVX-	t′axt-
sluindid	‘signifies, expresses’	AII	W2b	XVX-	·s°l°ən′d′-

Absolute				
marβ-ə∅′	→	marβə∅′	*marbai*	ZCP7[237]
Conjunct				
·t′axt-ə∅′	→	·t′axtə∅′	*ni·techtai*	Ml56b31
·s°l°ən′d′-ə∅′	→	·s°l°ən′d′ə∅′	*ní·sluindi*	Sg208b5

I am not aware of any attested absolute second person singular form of an i-verb, nor of any second person singular imperfect forms for either a-verbs or i-verbs. The ending for both absolute and conjunct is /-ə∅′/.

The analysis of the third person singular endings is not entirely straightforward, and has already been discussed in both the introduction to this subsection and in 4.3.2.2. For the majority of weak verbs, the most parsimonious way of formally representing the third person singular conjunct is to consider it to have a simple vocalic ending /-ə/. The final colour could be interpreted as a copy of the colour of the consonant before this ending, as regularly occurs in Old Irish phonology (see 3.3.2.3). This solution works perfectly well most weak verbs, such as *fo·fera*, *ní·tráchta*, and *ní·sluindi*, in the table below, in which verbs with root final a-colour have the ending -*a*, while verbs with root final i-colour have the ending -*i*. However, it fails for *do·lugai*, where one might expect ***do·lugu*, and for *nund·erbai*, where the expected outcome would be ***nund·erba*.[238]

It should be noted that there is a semantic difference between the a-verbs and the i-verbs and that the membership of a given weak verb in either of the two weak classes can be predicted by its semantics: “A verb is AII if it is transitive and causative and/or iterative. Otherwise it is AI.” (Le Mair 2011: 59). The clearest formal solution is thus to consider the two different classes to be characterised by two different third person singular conjunct endings: /-ə∅/ for the a-verbs, and /-ə∅′/.

[237] Meyer (1910: 269.12).

[238] As well as *do·lugai* and *erbaid*, this is true for *fo·dáli* ‘distributes’, *do·scéulai* ‘finds out’, *rádaid* ‘says’ and its compound *imm·rádai* ‘thinks on, reflects’, as well as the Latin borrowing *pridchaid* ‘preaches’ and a number of other verbs. The lack of, or inconsistent, medial i-colour in these verbs in the first place results from the failure of an **i* not lost through syncope or apocope in the prehistory of Old Irish to palatalise a preceding consonant or consonant cluster under certain conditions, most notably the presence of **ā* in the preceding syllable. See McCone (1996: 117; 1987: 27f.) for details.

During the Old Irish period, a certain confusion develops with respect to the conjugation of those verbs which have an a-colour or u-colour stem-final consonant but end in *-i*, such as *do·lugai* and *nund·erbai*. Already in the glosses they are found with a mixture of forms, sometimes showing an i-colour stem-final consonant and at others having an a-colour (or where appropriate u-colour) one (McCone 1987: 27-8). This is quite straightforwardly explained as confusion resulting from the mismatch between the semantics and the phonology. The following table shows the active flexion of the present third person singular of weak verbs.

Table 50. Active 3rd person singular flexion of weak verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
caraid	'loves'	AI	W1	XVX-	kar-
sluindid	'signifies, expresses'	AII	W2b	XVX-	s˚l˚ən′d′-
móraid	'praises, magnifies'	AI	W1	XVX-	m˚a∅˚r-
fo·fera	'causes, produces'	AI	W1	XVX-	·φ′ər-
*trách*t*aid*	'comments'	AI	W1	XVX-	tra∅xt-
do·lugai	'forgives'	AII	W2b	XVX-	·L˚əɣ˚-
erbaid	'entrusts'	AII	W2a	XVX-	∅′arβ-
coínid	'laments, bewails'	AII	W2a	XVX-	k˚a∅′n′-[239]

Absolute				
kar-əθ′	→	karəθ′	*caraid*	Wb75c4
s˚l˚ən′d′-əθ′	→	s˚l˚ən′d′əθ′	*sluindid*	Sg9b4
Relative				
m˚a∅˚r-əs	→	m˚a∅˚ras	*móras*	Wb17b22
s˚l˚ən′d′-əs	→	s˚l˚ən′d′əs	*sluindes*	Ml37a10
Conjunct				
·φ′ər-ə∅	→	·φ′arə∅	*fo·fera*	Wb2a17
·tra∅xt-ə∅	→	·tra∅xtə∅	*ní·trachta*	Ml74c12
·s˚l˚ən′d′-ə∅′	→	·s˚l˚ən′d′ə∅′	*ní·sluindi*	Sg25b14
·L˚əɣ˚-ə∅′	→	·L˚əɣ˚ə∅′	*do·lugai*	Ml51a15
·∅′arβ-ə∅′	→	·∅′arβə∅′	*nu-nd·erbai*[240]	Ml65b6
Imperfect				
·kar-əθ	→	·karaθ	*no-b·carad*[241]	Wb23d10
·k˚a∅′n′-əθ	→	·k˚a∅′n′aθ	*nu·coined*	Ml32b13

[239] At first glance, this would be taken as a straightforward denominative based on *caíne* 'weeping, lamenting', but the forms known to me instead appear to be based on a monosyllabic root. Furthermore, the history of *caíne* is not well understood: Vendryes (LEIA C-18) considers it to be a borrowing from Welsh *cwyn*, with the same meaning, but Le Mair (2011: 177) suggests that matters may be more complex.
[240] With particle /N˚ə-/ and masculine 3rd person singular infix pronoun /-ðᴺ/.
[241] With 2nd person plural infix pronoun /-β/.

The absolute forms in the table above do not present any problems: as in the vast majority of present tense patterns, the active third person singular absolute ending is /-əθ′/, while the relative form has /-əs/. The imperfect is similarly straightforward, with the ending /-əθ/. The active third person singular conjunct, as discussed above, has the ending /-ə∅/ for the a-verbs, and /-ə∅′/ for the i-verbs. The following table shows attested forms of the first person plural.

Table 51. Active 1st person plural flexion of weak verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
láthraid	'kills'	AI	W1	XVXVX-	La∅θər-
techtaid	'has, possesses'	AI	W1	XVX-	t′axt-
coínid	'laments, bewails'	AII	W2a	XVX-	k˚a∅′n′-[242]
ad·cobra	'desires'	AI	W1	XVXVX-	·k˚əβər-
moídid	'boasts	AII	W2a	XVX-	m˚a∅′d′-

Absolute				
La∅θər-əm′ə∅′	→	La∅θrəm′ə∅′	*lathrimmi*	Wb8d9
k˚a∅′n′-əm′ə∅′	→	k˚a∅′n′m′ə∅′	*cóinmi*	Wb4a23
Relative				
t′axt-əm′a∅′	→	t′axtma∅′	*techtmae*	Ml74d4
Conjunct				
·k˚əβər-əμ	→	·k˚aβraμ	*ad·cobram*	Ml94a7
·m˚a∅′d′-əμ	→	·m˚a∅′d′aμ	*ni-n·móidem*[243]	Wb23d23

The active first person plural absolute ending is /-əm′ə∅′/, with relative /-əm′a∅′/, and conjunct /-əμ/. The table below shows the second person plural.

Table 52. Active 2nd person singular flexion of weak verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
fercaigid	'is angry'	AII	W2a	XVX-əɣ-	φ′arg-əɣ-
techtaid	'has, possesses'	AI	W1	XVX-	t′axt-

Absolute				
ˈφ′arg-ˌəɣ-əθ′a∅′	→	ˈφ′arˌgəɣθa∅′	*fercaigthe*	Ml20b13
Conjunct				
·t′axt-əθ′	→	·t′axtəθ′	*no·techtaid*	Ml115b12
·ˈφ′arg-ˌəɣ-əθ′	→	·ˈφ′arˌgəɣəθ′	*in·fercaigid*[244]	Ml20b15

[242] At first glance, this would be taken as a straightforward denominative based on *caíne* 'weeping, lamenting', but the forms known to me instead appear to be based on a monosyllabic root. Furthermore, the history of *caíne* is not well understood: Vendryes (LEIA C-18) considers it to be a borrowing from Welsh *cwyn*, with the same meaning, but Le Mair (2011: 177) suggests that matters may be more complex.
[243] With negative /N′ə∅′-/ and 1st person plural infix pronoun /-n/.
[244] With interrogative /∅′ən′-/.

Like the first person plural, the conjugation of the active second person plural presents no difficulties. The ending is /-əθə∅′/ for the absolute, and /-əθ′/ for the conjunct. The form *fercaigthe* in the absolute example here could be considered deponent but there is no distinction in flexion between active and deponent in the second person plural. The following table shows forms of the active third person plural.

Table 53. Active 3rd person singular flexion of weak verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
tráchtaid	'comments'	AI	W1	XVX-	tra∅xt-
guirid	'warms, burns'	AII	W2b	XVX-	g°ər′-
soíraid	'frees, liberates'	AI	W1	XVX-	s°a∅′r-
íccaid	'pays, atones for'	AI	W1	XVX-	∅′ə∅′k-
coínid	'laments, bewails'	AII	W2a	XVX-	k°a∅′n′-
techtaid	'has, possesses'	AI	W1	XVX-	t′axt-
caraid	'loves'	AI	W1	XVX-	kar-
moídid	'boasts	AII	W2a	XVX-	m°a∅′d′-

Absolute				
tra∅xt-əd′	→	tra∅xtəd′	*trachtait*	Ml51a14
g°ər′-əd′	→	g°ər′əd′	*guirit*	Ml39c24
Relative				
s°a∅′r-əd′a∅′	→	s°a∅′rda∅′	*soirdae*	Ml75a2-3
∅′ə∅′k-əd′a∅′	→	∅′ə∅′kta∅′	*íccte*	Wb30a2
k°a∅′n′-əd′a∅′	→	k°a∅′n′d′a∅′	*coinde*	Ml86d1
Conjunct				
·t′axt-əd′	→	·t′axtad	*ni·tectat*	Wb12b21
·kar-əd	→	·karad	*ni-m·charat*[245]	Wb5c6
·m°a∅′d′-əd	→	·m°a∅′d′ad	*no-s·móidet*[246]	Wb17c5
Imperfect				
·kar-əd′əs′	→	·kardəs′	*no·chartais*	Fél Nov 16

As can be seen from the examples above, the active third person plural forms are /-əd′/ for the absolute, /-əd′a∅′/ for the relative, /-əd/ for the conjunct, and /-əd′əs′/ for the imperfect. This concludes the discussion of weak verbs in the present, although many of the same verbs are discussed again, under the rubric of the present passive (5.2.2), the a-subjunctive (6.1.2), the f-future (6.2.1), and the s-preterite (6.3.1). However, the next subsection turns instead to the flexion of strong verbs in the present.

[245] With negative /N′ə∅′-/ and 1st person singular infix pronoun /-m^{L}/.
[246] With particle /N°ə-/ and third person plural infix pronoun /-s^{N}/.

5.1.2. Strong verbs

This section examines the present flexion of strong verbs which do not take a nasal infix (*GOI*: BI, BII; *EIV*: S1a, S1b, S1c, S2). The nasal presents (*GOI*: BIII, BIV, BV; *EIV*: S1d, S3), which are also considered strong verbs, are discussed in section 5.1.3. Strong verbs exhibit a greater variety in their conjugation than weak verbs, and are far less uniform in terms of their stem formation. In the present, the most salient feature of this class is the variation in the colour of the stem-final consonant. Three main patterns may be identified.

In the first, most frequent and most important paradigm, the final consonant alternates in colour depending on the person and number of the verb. In this pattern (*GOI*: BI; *EIV*: S1a), the stem-final consonant has u-colour, or sometimes i-colour, in the first person singular, i-colour in the second person singular and plural and in the third person singular, and a-colour in the first and third persons plural in the present. A different pattern is found in the imperfect. A subset of these verbs, distinguished by McCone (*EIV*: S1b), but not by Thurneysen, have further particularities in their flexion, particularly in the third person singular conjunct.

In a second major pattern, also identified by McCone (*EIV* S1c) but not given as a separate class by Thurneysen, the stem-final consonant generally has a-colour throughout the paradigm, with occasional exceptions, discussed below. In the third pattern (*GOI*: BII; *EIV*: S2), rather i-colour is found in the stem-final consonant throughout the entire paradigm. In what follows, these three patterns are referred to as the alternating, a-colour, and i-colour patterns respectively.

While the pattern to which a particular verb belongs is not predictable on phonological criteria, a number of generalisations can be made. Almost without exception, roots with <e> or <é>, i.e. those with initial i-colour and the low vowel /a/, take the alternating pattern, although verbs with other root shapes may also take this pattern. Those verbs which take the a-colour pattern have roots in <o>, or more rarely in <a>, i.e. they have root shapes /X˚aX-/ or /XaX-/. Verbs taking the i-colour pattern typically show <a> in the root, i.e. they have the shape /XaX′-/, although there are also a few important of verbs in this class which have <ui> or <i>, i.e. the root shapes /X˚əX′-/ or /X′əX′-/. Verbs which show the i-colour pattern not infrequently have subjunctive stems beginning /X′a-/, as discussed in subsection 4.3.2.3, above.

In what follows, the alternating pattern of strong verbs is discussed first, in subsection 5.1.2.1. Following this, the less frequent a-pattern is examined in 5.1.2.2, and then the i-colour pattern in 5.1.2.3.

5.1.2.1. Present flexion of strong verbs: alternating pattern

Strong verbs which take the alternating pattern comprise largest and most important group of Old Irish strong verbs. They are termed BI by Thurneysen (1946) and include McCone's (1997) S1a and S1b groups. The colour of the final consonant of the present stem of these verbs is conditioned by the person and number of the verb, having i-colour in the second person, both singular and plural, and in the third person singular, and a-colour in the first and third person plural. In the first person singular, there is variability between i-colour and u-colour, conditioned by the ending used: when the ending is /-ə∅˚/ then the final consonant of the stem also has u-colour, whereas when it is /-əm′/, the final consonant has i-colour instead. In these instances I have not marked the stems as being specified for either colour (i.e. default a-colour) but have rather filled in the colour on the basis of the ending used. In the third person singular conjunct, a small group of verbs, discussed further below, have final a-colour rather than i-colour.

In three verbs, *saigid* 'approaches, seeks', *saidid* 'sits', and *laigid* 'lies', as well as their compounds, there is alternation between /Ca-/, with the vowel spelled <ai>, before an i-colour consonant, and /C′a-/, with the vowel spelled <e>, before an a-colour consonant. This phenomenon is also found with the preposition *ar* (see subsection 4.2.2.3) and in some nouns as well (for further details see Jaskuła 2006: 181ff.).

Derived from the alternating pattern verbs are a small group of compound verbs which McCone labels S1b. These are characterised by roots ending in a coronal fricative, including compounds of *feidid* 'brings, leads', *reithid* 'runs', the root *féd-* (which is unattested as a simple verb), and *téit* 'goes'. In the third person singular conjunct, they end in a-colour /-d/, and this obstruent has a tendency to spread to other persons of the singular as well. These verbs are shown below with a stem ending in a fricative /-ð-/, which becomes a stop /-d-/ in the singular, but not in the third person plural examples. By the Old Irish period, this pattern had already begun to extend also

to verbs for which the root was stressed, e.g. *ad·fét* ‘tells, relates’ (McCone 1987: 30).[247] The following paragraphs examine examples of the various present tense forms of the alternating pattern class of Old Irish verbs, beginning with the first person singular.

Table 54. Active 1st person singular flexion of alternating pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
téit	‘goes’	BI	S1a	XVX-	t′a∅ɣ-[248]
beirid	‘carries’	BI	S1a	XVX-	b′ar-
ithid	‘eats’	BI	S1a	XVX-	∅′əθ-
meilid	‘grinds, crushes’	BI	S1a	XVX-	m′al-
as·beir	‘says’	BI	S1a	XVX-	·b′ar-
con·rig	‘binds together’	BI	S1a	XVX-	·R′əɣ-
as·feid	‘takes out’	BI	S1a	XVX-	·φ′að-
ar·reith	‘captures’	BI	S1a	XVX-	·R′aθ-
do·diat	‘leads down’	BI	S1b	XVX-	·d′ə∅′əð- → ·d′ə∅′əd-
ar·neat	‘expects, awaits’	BI	S1b	XVX-	·N′ah′əð-[249]→ ·N′ah′əd-
as·indet	‘declares’	BI	S1b	XVX-	·∅′ən′d′əð-→ ·∅′ən′d′əd-
fo·slig	‘smears’	BI	S1a	XVX-	·s′l′əɣ-

Absolute				
t′a∅ɣ-ə∅°	→	t′a∅ɣ°ə∅°	*tíagu*	Wb17b20
b′ar-ə∅°	→	b′ər°ə∅°	*biru*	RC10[250]
∅′əθ-əm′	→	∅′əθ′əm′	*ithim*	Sg146b5
m′al-əm′	→	m′al′əm′	*melim*	Sg57a2

Conjunct				
·b′ar-∅°	→	·b′ər°	*as·biur*	Sg161a2
·R′əɣ-∅°	→	·R′əɣ°	*con·riug*	Sg181b1
·φ′að-∅°	→	·φ′əð°	*assa·fiud*	Sg221b4
·R′aθ-∅°	→	·R′əθ°	*ar·riuth*	K60a6
·d′ə∅′əd-∅°	→	·d′ə∅°əd°	*do·díut*	Sg152b1
·N′ah′əd-∅°	→	·N′ah°əd°	*ar·neut*	Wb14a8
·∅′ən′d′əd-∅°	→	·∅′ən′d′əd°	*as·indiut*	K60b3
·s′l′əɣ-əm′	→	·s′l′əɣ′əm′	*fo·sligim*	Sg173a7

Imperfect				
·b′ar′-əN′	→	·b′ar′əN′	*as·berinn*	Ml91b10

[247] This pattern results from the loss of an unstressed vowel between dental obstruents in the prehistory of Irish and subsequent assimilation of manner. See McCone (1981) for the historical developments.
[248] The conjugation of this verb is irregular. In the third person singular it has stem-final /-d′-/, whereas in other persons it has rather final /-ɣ′-/.
[249] See Bergin (1928a: 111) and the discussion under the third person plural below for justification of this representation.
[250] Stokes (1889: 88.2).

As can be seen from the table above, two endings are found for the absolute first person singular of alternating pattern strong verbs: /-ə∅˚/ and /-əm′/. It is my impression that the second of the two is more common, but a proper corpus study would be necessary to corroborate this. Frequently, although not without exception, verbs with the alternating pattern exhibit vowel ablaut in the first and second persons singular, with root /a/ raised to /ə/, but it is interesting that this raising only occurs in the first person singular with the ending /-ə∅˚/, never with /-əm′/. This could be seen as the converse of the the metaphony rule which lowers /ə/ to /a/ before an a-colour consonant, as discussed in subsection 3.3.3.3. It is not, however, a phonological rule of Old Irish.

In the conjunct, the ending /-∅˚/ is by far more frequent than /-əm′/ for this class of verbs, as can be seen from the examples. These forms also show the raising of /a/ to /ə/ characteristic of many first person singular forms, although again only when the ending is /-∅˚/, never when it is /-əm′/. The first person singular of the imperfect of alternating pattern strong verbs appears to have i-colour and the ending is /-əN′/. The following table shows examples of the second person singular.

Table 55. Active 2nd person singular flexion of alternating pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
saidid	‘sits	BI	S1a	XVX-	s′að- → að′-
beirid	‘carries’	BI	S1a	XVX-	b′ar- → b′ar′-
as·beir	‘says’	BI	S1a	XVX-	·b′ar- → ·b′ar′-
do·adbat	‘displays’	BI	S1b	XVX-	·∅aðβəð → ·∅aðβəd′-
con·rig	‘binds together’	BI	S1a	XVX-	·R′əɣ- → ·R′əɣ′-
do·beir	‘gives’	BI	S1a	XVX-	·b′ar- → ·b′ar′-
			Absolute		
að′-ə∅′	→	að′ə∅′		*saidi*	Ml101c6-7
b′ar′-ə∅′	→	b′ər′ə∅′		*biri*	Fer26b31[251]
			Conjunct		
·b′ar′-∅′	→	·b′ər′		*as·bir*	Sg66b10
·∅aðβəd′-∅′	→	·∅aðβəd′		*do·adbit*	Sg159a2
·R′əɣ′-ə∅′	→	·R′əɣ′ə∅′		*con·rigi*	Ml119b8
			Imperfect		
·b′ar-əθa∅	→	·b′arθa∅		*du·bertha*	Ml130d15

As can be seen from the table above, the second person singular of alternating pattern verbs is characterised by stem-final i-colour in the present tense and by a-colour in the

[251] See Bergin (1938c: 135).

imperfect. In the absolute, the ending is consistently /-ə∅′/.[252] For the conjunct, /-∅′/ and no ending are possible formal representations. However, as /-∅′/ is found widely elsewhere for the second person singular conjunct I favoured it here as well.[253] The ending for the imperfect is /-əθa∅/. The following table shows examples of the third person singular of strong verbs which take the alternating pattern

Table 56. Active 3rd person singular flexion of alternating pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
geilid	'grazes'	BI	S1a	XVX-	g′al- → g′al′
téit	'goes'	BI	S1a	XVX-	t′a∅ɣ- → t′ad′-
beirid	'carries'	BI	S1a	XVX-	b′ar- → b′ar′-
as·beir	'says'	BI	S1a	XVX-	·b′ar- → ·b′ar′-
con·icc	'is capable of'	BI	S1a	XVX-	·∅′ək- → ·∅′ək′-
saigid	'approaches, seeks'	BI	S1a	XVX-	s′aɣ- → saɣ′-
ibid	'drinks'	BI	S1a	XVX-	∅′əβ- → ∅′əβ′-
do·diat	'leads down'	BI	S1b	XVX-	·d′ə∅′əð- → ·d′ə∅′əd-
do·adbat	'displays'	BI	S1b	XVX-	·∅aðβəð → ·∅aðβəd′-
ad·fét	'tells, relates'	BI	S1a	XVX-	·s′l′əɣ-

Absolute				
g′al′-əθ′	→	g′al′əθ′	*geilid*	Sg143b1
t′a∅d′-	→	t′a∅d′	*téit*	Ml103d27
Relative				
b′ar′-əs	→	b′ar′as	*beres*	Ml27c1
t′a∅d′-a∅′	→	t′a∅d′a∅′	*téte*	Wb9a3
Conjunct				
·b′ar′-	→	·b′ar′	*as·beir*	Ml17b9
·∅′ək′-	→	·∅′ək′	*con·icc*	Sg27a18
·saɣ′-	→	·saɣ′	*ni·saig*	Ml131a4
·∅′əβ′-	→	·∅′əβ′	*ni·ib*	Wb28b24
·d′ə∅′əd-	→	·d′ə∅′ad	*do·ṅdiat*	Sg8a9
·∅aðβəd-	→	·d′ə∅′ad	*do·adbat*	Sg198a24
·φ′a∅d-	→	·φ′a∅d	*ad·fét*	Ml31b19
Imperfect				
·b′ar′-əθ	→	·b′ar′aθ	*as·bered*	Ml54c18
·t′a∅ɣ′-əθ	→	·t′a∅ɣ′aθ	*no·teged*	Ml54c18

[252] Occasionally, the absolute ending /-ə∅′/ is found in the conjunct too. While this is regular for the a-pattern and i-pattern verbs explored in 5.1.2.2 and 5.1.2.3, below, it is not particularly common in the alternating pattern. Beyond *con·rigi*, the example given above, other forms I have come across are *du·rigi* (Ml108d08) from *do·rig* 'strips, lays bare' and *du·fichi* from *do·fich* 'punishes, avenges'. In the same corpus, forms with /-∅′/ are also found, i.e. *do·fich* (Ml19d3; Ml115b13) and *du·fich* (Ml123d8).

[253] One argument for this is the fact that the raising of /a/ to /ə/, discussed above with reference to the first person singular, occurs in this case as well.

As can be seen from the table, the third person singular shows i-colour in both present and imperfect. The present absolute ending is /-əθ′/, while that of the imperfect is /-əθ/, both spelled most often with <d>, although the irregular verb *téit* can instead be considered to have the ending /-∅′/, like the t-preterite, as discussed in 4.3.3.4, above, and in 6.3.2, below. The relative ending is usually /-əs/, although *téit*, like other forms in /-d/, takes rather the ending /-a∅′/ instead.[254]

As in the second person singular, the third person singular conjunct can be analysed as being essentially endingless, or as having the ending /-∅′/. In this case, the former solution is preferred, as it is syntagmatically more parsimonious and no worse from the paradigmatic perspective, as both no ending and /-∅′/ are attested elsewhere. The following table gives examples of the first person plural flexion.

Table 57. Active 1st person plural flexion of alternating pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
beirid	'carries'	BI	S1a	XVX-	b′ar-
téit	'goes'	BI	S1a	XVX-	t′a∅ɣ-
feidid	'brings, leads	BI	S1a	XVX-	m′al-
as·beir	'says'	BI	S1a	XVX-	·b′ar-
ar·beir	'lives'	BI	S1a	XVX-	·b′ar-
		Absolute			
b′ar-əm′ə∅′	→	b′armə∅′		*bermai*	*GOI*: §558
t′a∅ɣ-əm′ə∅′	→	t′a∅ɣmə∅′		*tiágmi*	Wb15b28
		Relative			
φ′að-əm′a∅′	→	φ′aðma∅′		*fedme*	Wb15b26
t′a∅ɣ-əm′a∅′	→	t′a∅ɣma∅′		*tiagme*	Wb15b28
		Conjunct			
·b′ar-əμ	→	·b′araμ		*as·beram*	Ml25d11
		Imperfect			
·∅ər′-b′ar′-əm′əs′	→	·∅′ər′b′ər′m′əs′		*húa·n-erbirmis*[255]	Ml135d3

As can be seen from the table stem ends in a-colour in the present first person plural. The endings are /-əm′ə∅′/ in the absolute, /-əm′a∅′/ in the relative, and /-əμ/ in the

[254] The subset of verbs with unstressed roots and final /-d/, identified as S1b by McCone (1987: 29f.), have an a-colour final consonant in the third person singular conjunct. Given that the ending /-∅/ is not found elsewhere for the third person singular conjunct, it seems easiest to consider the a-colour to be rather a property of the stem formation of this subclass and these forms to consist in the bare stem. In this sense, they can be treated in exactly the same way as the other verbs in this class, as having no ending in the conjunct third person singular.

[255] With fusion of preposition *ó* 'from' and nasalising relative particle, /∅°a∅^{N}/.

conjunct. The imperfect form given here is somewhat difficult, as the ending of the imperfect first person plural is usually taken to be /-əmʹəsʹ/ and in this instance the first vowel of the ending is syncopated. One might consider this form to have an exceptional ending /-mʹəsʹ/, or alternatively explain it in terms of functionally driven metathesis of the /rʹ/ and the following vowel. The following table shows examples from the second person plural.

Table 58. Active 2nd person plural flexion of alternating pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
as·beir	'says'	BI	S1a	XVX-	·bʹar- → ·bʹarʹ-
		Conjunct			
·bʹarʹ-əθʹ	→	·bʹarʹəθʹ		*as·beirid*	Wb5a31

As can be seen from the table, the second person plural has stem-final i-colour in the first person plural, while the conjunct ending is /-əθʹ/. As far as I am aware, neither the absolute nor the imperfect is attested for this pattern of verbs. The following table shows third person plural forms of strong verbs with the alternating pattern.

Table 59. Active 3rd person plural flexion of alternating pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
reithid	'runs'	BI	S1a	XVX-	Rʹaθ-
claidid	'digs'	BI	S1a	XVX-	klað-
téit	'goes'	BI	S1a	XVX-	tʹa∅ɣ-
saigid	'approaches, seeks'	BI	S1a	XVX-	sʹaɣ-
geilid	'grazes'	BI	S1a	XVX-	gʹal-
as·beir	'says'	BI	S1a	XVX-	·bʹar-
con·icc	'is capable of'	BI	S1a	XVX-	·∅ʹək-
ad·fét	'tells, relates'	BI	S1b	XVX-	·sʹlʹəɣ-
ar·neat	'expects, awaits'	BI	S1b	XVX-	·Nʹahʹəð-
fo·saig	'afflicts, annoys'	BI	S1a	XVX-	·sʹaɣ
		Absolute			
Rʹaθ-ədʹ	→	Rʹaθədʹ		*rethait*	Ml138d6
klað-ədʹ	→	klaðədʹ		*cladait*	Ml76d14
tʹa∅ɣ-ədʹ	→	tʹa∅ɣ-∅-ədʹ		*tiagait*	Wb5c16
saɣ-ədʹ	→	sʹaɣad		*segait*	Ml66b5
		Relative			
gʹal-ədʹa∅ʹ	→	gʹalda∅ʹ		*géldae*	Ml80a11
		Conjunct			
·bʹar-əd	→	·bʹarad		*as·berat*	Ml17b4
·∅ʹək-əd	→	·∅ʹakad		*con·ecat*	Sg33a16
·φʹa∅ð-əd	→	·φʹa∅ðad		*ad·fiadat*	Wb28c23

·N′ah′əð-əd	→	·N′aθ′ad	*ar·neithet*	Ml39d25
·saɣ-əd	→	·s′aɣad	*fo-dan·segat*[256]	Ml27c7
		Imperfect		
·b′ar′-ədəs′	→	·b′ar′d′əs′	*as·bertis*	Ml62c13
·saɣ′-əd′əs′	→	·saɣ′d′əs′	*fo·saigtis*	Ml97d14

As can be seen above, the third person plural has stem-final a-colour in the present, but seemingly rather i-colour in the imperfect. The absolute ending is /-əd′/, while the relative ending is /-əd′a∅′/, the conjunct ending /-əd/, and the imperfect one /-əd′əs′/. The i-colour consonant in present *ar·neithet*, corroborated by first person plural *ara·nethem* (Wb31c17), results from progressive assimilation through syncope (see 3.3.2.1). I have thus sided with Thurneysen (*GOI*: §592, §846) and Bergin (1928a: 111), who see this verb as a compound based on the root *sed*-, rather than Pedersen (VGKii: 584), who postulates instead a root *neth*-. Bergin's insight that the the /-θ′-/ in this form results from syncope, while the singular forms (such as first person singular *ar·neut*, above) have rather medial /-h′-/, very elegantly explains the variation found in the forms of this verb. While medial /h/ is not generally considered to have occurred in Old Irish, I see no reason why it *must* have been lost intervocalically prior to the Old Irish period.

While *do·tuit* 'falls', and other verbs based on the same root, may originally have belonged to the alternating pattern, third person plural forms such as *nád·tutet* (Sg50a7) and *con·tuítet* (Sg205a5) suggest that by the Old Irish period there were inflected according to the i-colour pattern explored in 6.2.3.[257]

This concludes the discussion of the present of strong verbs with the alternating pattern. The next subsection, 5.1.2.2, looks rather at strong verbs with the a-colour pattern, while 5.1.2.3 examines those with the i-colour pattern.

5.1.2.2. Present flexion of strong verbs: a-colour pattern

A small group of verbs have an a-colour stem-final consonant throughout the present paradigm. Exceptions to a-colour occur in the first person singular, where they appear

[256] With 1st person plural infix pronoun /-ðan/.
[257] See Pedersen (VGK: 656f.), Thurneysen (*GOI*: §543) and Bergin (1928b: 193) for further discussion of this verb.

to be influenced by a u-colour ending, and in the third person singular conjunct. While the i-colour pattern verbs, explored below in 5.1.2.3, are considered a distinct class in the work of both Thurneysen and McCone (*GOI*: BII; *EIV*: S2), the a-colour pattern is subsumed into the alternating pattern class by Thurneysen (*GOI* BI), and considered a subset thereof by McCone (*EIV* S1c).

These verbs show a strong tendency, from the Old Irish period onwards, to adopt the flexional properties of the alternating or i-colour patterns. It is perhaps likely that more verbs, for which we have insufficient attestation in the early period, also belonged to this group (McCone 1987: 30). Examples of a-colour pattern verbs from Old Irish include *canaid* 'sings', *gonaid* 'wounds', *orcaid* 'kills, slays', and *maraid* 'lasts', as well as compounds built on these, and a deponent verb, *ad·gládathar* 'addresses'.

As these verbs are only very marginally attested in the first person plural and in the second person plural, I have merged examples and discussion of these with those of the corresponding singular forms. Examples of the first person are shown below.

Table 60. Active 1st person flexion of a-colour pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
gonaid	'wounds'	BI	S1c	XVX-	g˚an-
canaid	'sings'	BI	S1c	XVX-	kan-
as·oirc	'cuts down'	BI	S1c	XVX-	·∅˚arg-
for·cain	'teaches'	BI	S1c	XVX-	·kan-
Absolute 1st person singular					
g˚an-a∅˚	→	g˚an˚a∅˚	*gono*		ZCP13[258]
kan-ə∅˚	→	kən˚ə∅˚	*caunu*		ZCP21[259]
Conjunct 1st person singular					
·∅˚arg-∅˚	→	·∅˚ər˚g˚	*ess·urg*		Mulc 360
·kan-∅˚	→	·kən˚	*for·chun*[260]		Wb10a13
·kan-əm′	→	·kanəm′	*for·chanim*[261]		Wb8c3
Relative 1st person plural					
kan-əm′a∅′	→	kanma∅′	*canmae*		Fél Ep. 242

The first person singular absolute is not extensively attested for this class of verbs, but that not withstanding, a variety of forms are found. The common first person singular ending /-ə∅˚/ is found in *caunu*, which shows the same high vowel as the alternating

[258] Thurneysen (1921: 106.5).
[259] Thurneysen and Williams (1940: 283).
[260] The initial of the stem is lenited here as it is relative.
[261] The initial of the stem is lenited here as it is relative.

pattern verbs.[262] It seems very likely that *canu* (Dillon 1952: 66.50) reflects the same formation, although the spelling is simply <a>.[263] Two cases of what appears to be the ending /-a∅˚/ are found together in the phrase *gono mil orgo mil marbu mil* 'ich verwunde das Tier, ich schlage das Tier, ich töte das Tier' (Thurneysen 1921: 106.5). Here, *gono* is the first person singular absolute of *gonaid* 'wounds' whereas *orgo* is the first person singular absolute of *orcaid* 'kills, slays'.

It is difficult to generalise on the basis of such slim evidence, but while it is possible that /-a∅˚/ is a distinct ending found only in this class of verbs, it is perhaps more plausible to consider this as mere orthographic, or perhaps idiolectal, idiosyncracy. The fact that <o> occurs in both syllables of these forms is suggestive, but there is clearly no synchronic phonological rule in Old Irish to lower an ending to /a/ after /a/ in the stem syllable.

In the first person singular conjunct, both /-∅˚/ and /-əm′/ are found, and the same vowel raising which is found in the alternating pattern also occurs here when the u-colour ending is used. The only first person plural form of which I am aware is a relative form, with the usual ending /-əm′a∅′/, and I know of know imperfect first person singular tokens in this class. The following table examines rather the second person.

Table 61. Active 2nd person flexion of a-colour pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
canaid	'sings'	BI	S1c	XVX-	kan-
fris·oirc	'offends'	BI	S1c	XVX-	·∅˚arg-
Absolute 2nd person singular					
kan-ə∅′	→	kanə∅′	*cani*		Thes.ii 249.2
Conjunct 2nd person singular					
·∅˚arg-ə∅′	→	·∅˚argə∅′	*fris·orcai*		Ml44b31
Conjunct 2nd person plural					
·φ′r′əθ′-∅˚arg-əθ′	→	·φ′r′əθ˚argəθ′	*na·frithorcaid*		Ml114a9

From the examples of which I am aware, the second person singular ending for this class of verbs is /-ə∅′/ in both absolute and conjunct. In this respect, this class aligns with the i-colour pattern rather than the alternating pattern, where the ending for the

[262] One could equally consider this root to have underlying /ə/, neutralised to /a/ everywhere except in these forms, but there is no other evidence for this.
[263] This orthographic variation is well-attested in Old Irish. See subsection 3.1.2.3 for details.

conjunct is simply /-∅′/. I am not aware of any absolute or deuterotonic examples for the second person plural for this class, or for imperfect of either the second person singular or second person plural, but the ending for the second person singular conjunct ending is /-əθ′/. The table below shows forms of the third person singular.

Table 62. Active 3rd person singular flexion of a-colour pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
canaid	'sings'	BI	S1c	XVX-	kan-
gonaid	'wounds'	BI	S1c	XVX-	g°an-
orcaid	'kills, slays'	B1	S1c	XVX-	∅°arg-
maraid	'lasts'	B1	S1c	XVX-	mar-
for·cain	'teaches'	BI	S1c	XVX-	·kan-
as·oirc	'cuts down'	BI	S1c	XVX-	·∅°arg-
fris·oirc	'offends'	BI	S1c	XVX-	·∅°arg-

Absolute				
kan-əθ′	→	kanəθ′	*canaid*	Thes.ii 315.5
g°an-əθ′	→	g°anəθ′	*gonaid*	LU3389
∅°arg-əθ′	→	∅°argəθ′	*orcaid*	Ml19d6
mar-əθ′	→	marəθ′	*maraith*	Thes.ii p.xxii
Relative				
kən-əs	→	kanas	*canas*	Wb27b27
∅°arg-əs	→	∅°argəs	*orcas*	Ml28a4
Conjunct				
·g°an-	→	·g°an	*ni·gon*	TBC2390
·∅′arg-∅′	→	·∅°arg′	*as·oirc*	Sg33a2
·kan-∅′	→	·kan′	*for·cain*	Ml128d9
·mar-∅′	→	·mar′	*nád·mair*	Wb3c15
Imperfect				
·∅°arg-əθ	→	·∅°argəθ	*fris·orcad*	Ml118a1

The present third person singular absolute ending is the typical /-əθ′/ for this class of verbs. The imperfect ending is also the usual /-əθ/. In this respect, the only difference between this class and the alternating pattern verbs is the fact that these exhibit stem-final a-colour, whereas in the alternating pattern i-colour is found instead.

One might imagine that the conjunct would lack an ending, as is the case for the other strong verbs discussed in this section. However, final i-colour as the exponence of the third person singular is found in both alternating pattern and i-colour pattern verbs. The verbs discussed here are similar, the only difference being that this i-colour must be formally represented by means of the person ending /-∅′/. The spelling ·*gon*, above,

with an apparent a-colour final, is late and quite uncommon.[264] There seems to be little doubt that the third person singular conjunct ending for these verbs was /-∅′/ in the Old Irish period, providing a key bridgehead for their eventual assimilation to the more common alternating and i-colour patterns. The final table in this subsection presents third person plural forms of the present of a-colour pattern strong verbs.

Table 63. Active 3rd person plural flexion of a-colour pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
maraid	'lasts'	BI	S1c	XVX-	mar-
canaid	'sings'	BI	S1c	XVX-	kan-
for·cain	'teaches'	BI	S1c	XVX-	·kan-
fris·oirc	'offends'	BI	S1c	XVX-	·∅˚arg-

Absolute				
mar-əd′	→	mar-əd′	*marait*	Fél Pro. 88
Relative				
kan-əd′a∅′	→	kanda∅′	*cantae*	Fél Dec 28
Conjunct				
·kan-əd	→	·kanad	*for·canat*	Ml28a15
·∅˚arg-əd	→	·∅˚argəd	*fris·orcat*	Ml15a8
Imperfect				
·kan-əd′əs′	→	kandəs′	*no·cantis*	Fél Jul 31

The third person plural forms of this class display few particularities. The absolute ending is /-əd′/, the relative /-əd′a∅′/, the conjunct /-əd/, and the imperfect /-əd′əs′/. For the relative, *mardda* (Thes.ii xxii), from *maraid*, is found on the margins of the St. Gallen manuscript, but its final vocalism is irregular. Other early forms, such as *mairte* (Fél Pro. 194) and *oircte* (Strachan 1904: 195.7) reflect the expected vocalism, but have already gone over to i-colour inflexion.[265]

This concludes the discussion of the flexion of a-colour pattern of strong verbs in the present. The next subsection examines rather the present flexion of strong verbs of the i-colour pattern.

[264] One might point out that there is analogical pressure to generalise the a-colour not only from other forms in the paradigm, but also from the class of nasal presents ending in a broad consonant in the third person singular, discussed in section 5.1.3.3, below. Perhaps a key difference here is the colour of the root-initial consonant: the nasal presents in question always have roots beginning with an i-colour consonant, whereas the class under discussion here always have roots beginning with an a-colour or u-colour consonant, for which there are far more parallels among verbs which take the alternating pattern or the i-colour pattern.

[265] Similarly, imperfect *fris·oirctis* (Ml67b14).

5.1.2.3. Present flexion of strong verbs: i-colour pattern

In these verbs, labelled BII by Thurneysen (1946) and S2 by McCone (1987), the final consonant of the stem is characterised by i-colour throughout the present. There are no more than a dozen roots associated to this class, with examples including *gaibid* 'takes', *guidid* 'asks, prays', *airid* 'ploughs', *gairid* 'calls', and *fo·daim* 'suffers, endures'. A small number of deponent verbs associated to this class are discussed with other deponent verbs in 5.2.1. These include *midithir* 'judges', *gainithir* 'is born', *do·moinethar* 'supposes' and *ro·laimethar* 'dares'.

Verbs of this class are particularly liable to alter the colour of their root consonants in the formation of other stems. This occurs with *gainithir* and *do·moinethar* in the subjunctive (see 6.1.2), as well as to *guidid* and *bruinnid* 'springs forth' (see 6.1.1) and their compounds. In the preterite (see 6.3.1) these verbs regularly appear to have an a-colour stem-final consonant. Examples of each person and number are given in the following paragraphs, beginning with the first person singular, below.

Table 64. Active 1st person singular flexion of i-colour pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
gaibid	'takes'	BII	S2	XVX-	gaβ′-
guidid	'prays, asks'	BII	S2	XVX-	g˚əð′-
ad·gair	'sues, prosecutes'	BII	S2	XVX-	·gar′-
for·congair	'commands, ordains'	BII	S2	XVX-	·k˚aŋgar′-
fo·daim	'suffers, endures'	BII	S2	XVX-	·daμ′-

Absolute				
gab′-ə∅˚	→	gab′ə∅˚	*gaibiu*	Trip 54.14
g˚əð′-əm′	→	g˚əð′əm	*guidimm*	Wb22a20
Conjunct				
·g˚əð′-əm′	→	·g˚əð′əm′	*nob·guidim*[266]	Wb25c29
·g˚əð′-ə∅˚	→	·g˚əð′-ə∅˚	*not·guidiu*[267]	Fél Ep. 37
·gar′-∅˚	→	·gər˚	*ad·gaur*	Thes.ii 228.30
·k˚aŋgar′-∅˚	→	·k˚aŋgar˚	*for·congur*	Wb19d25
·k˚aŋgar′-əm′	→	·k˚aŋgrəm′	*for·chongrimm*[268]	Wb9d30
Imperfect				
·φ˚arðaμ′-əN′	→	·φ˚arðaμəN′	*nád·fordamainn*	Ml107b8

[266] With particle /N˚ə-/ and 2nd person plural infix pronoun /-β/.
[267] With particle /N˚ə-/ and neuter 3rd person singular infix pronoun /-ðᴸ/.
[268] The initial of the stem is lenited here as it is relative.

For the absolute, my impression is that the ending /-əm′/ is easily the most frequently found first person singular ending in this class already in the Old Irish period (pace Stifter 2006: 103), although it is not difficult to find examples of the alternative, /-ə∅°/. Even when the latter ending is used the stem final consonant is never found with u-colour, unlike in the alternating and a-colour patterns discussed in 5.1.2.1 and 5.1.2.2, above.[269]

For the conjunct, both /-əm′/ and /-ə∅°/ are found when the root is stressed. The ending /-∅°/, as in *ad·gaur*, above, and *ara·gur* (O'Keefe 1905: 200 §17) from *ar·gair* 'forbids, prevents' is rarer and probably show the influence of many of the other strong verb formations, in which a u-colour final consonant is regular in the first person singular conjunct. When the root is unstressed, on the other hand, /-∅°/ is found quite regularly here as well, alongside the alternative ending /-əm′/.

With regard to the imperfect, while Thurneysen (*GOI*: §593) lists *no·guidinn* as the imperfect first singular of *guidid*, I have been unable to find this form. The ending is certainly /-əN′/, but the example here has rather a-colour, which would be regular if it could be considered to be first syncopated, then epenthesised.

Attestation of the second person singular of this class is quite sparse, but there is at least one conjunct form attested, given in the table below.

Table 65. Active 2nd person singular flexion of i-colour pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
fo·daim	'suffers, endures'	BII	S2	XVX-	·daμ′-
		Conjunct			
·daμ′-ə∅′	→	·daμ′ə∅′	*fo·daimi*		Ml55d11

For the absolute, *gaibi* is listed by Stifter (2006: 103) for this class, and the ending *-i* in McCone (1987: 69). While this can be reconstructed with a great degree of certainty, I am not aware of any examples in Old Irish, and no form is listed by Thurneysen (*GOI*: §560). In the conjunct, verbs of the i-colour pattern take /-ə∅′/ as the second person singular ending, like the weak verbs and the a-colour pattern verbs discussed above, as

[269] It is not impossible that *gairu* (Thurneysen and Williams 1940: 281), absolute first person singular of *gairid* 'calls', reflects /gər°ə∅°/, has a u-colour stem-final consonant, but is more plausible to see it as just an orthographic variant of /gar′ə∅°/ with the usual i-colour. In a similar vein, both *ro·laumur* (Wb17a8) and *ro·laimur* (Wb17c21 a prima manu) are attested for the first person singular of *ro·laimethar* 'dares'.

well as the nasal presents examined in 5.1.3, but unlike the alternating pattern verbs. During the Old Irish period, this ending spreads sporadically also to verbs with alternating stems (*GOI*: §560). The following table shows the forms of the third person singular for strong verbs which take the i-colour pattern.

Table 66. Active 3rd person singular flexion of i-colour pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
guidid	'prays, asks'	BII	S2	XVX-	g˚əð′-
gaibid	'takes'	BII	S2	XVX-	gaβ′-
fris·gair	'answers to'	BII	S2	XVX-	·gar′-
		Absolute			
g˚əð′-əθ′	→	g˚əð′əθ′	*guidid*		Wb27d7
		Relative			
gaβ′-əs	→	gaβ′as	*gaibes*		Sg12a4
g˚əð′-əs	→	g˚əð′as	*guidess*		Wb24d19
		Conjunct			
·gar′-	→	·gar′	*fris·gair*		Sg193b6
		Imperfect			
·gaβ′-əθ	→	·gaβ′aθ	*fris·gaibed*		Ml49a24

In the third person singular, the i-colour pattern verbs conjugate identically to the alternating pattern ones. The absolute ending is /-əθ′/, the relative ending /-əs/, the conjunct ending null, and the imperfect ending /-əθ/. The following table examines the first person plural.

Table 67. Active 1st person plural flexion of i-colour pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
guidid	'prays, asks'	BII	S2	XVX-	g˚əð′-
fo·daim	'suffers, endures'	BII	S2	XVX-	·daμ′-
		Absolute			
g˚əð′-əm′ə∅′	→	g˚əð′m′ə∅′	*guidmi*		Wb25d21
		Relative			
g˚əð′-əm′a∅′	→	g˚əð′m′a∅′	*guidme*		Wb4a27
		Conjunct			
·daμ′-əμ	→	·daμ′aμ	*fo·daimem*		Ml111c13

In the first person plural, the endings are also regular. The absolute ending is /-əm′ə∅′/, while the relative ending is /-əm′a∅′/ and the conjunct ending /-əμ/. In the following

table, forms of the second person plural of the i-colour pattern strong verbs are presented.

Table 68. Active 2nd person plural flexion of i-colour pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
ad·gair	'sues, prosecutes'	BII	S2	XVX-	·gar′-
guidid	'prays, asks'	BII	S2	XVX-	g˚əð′-
		Conjunct			
·gar′-əθ′	→	·gar′əθ′	*at·gairith*[270]		Wb9c22
		Imperfect			
·gaβ-əθ′a∅′	→	gaβ′θ′a∅′	*nos·gabthæ*		Ml68b2

As can be seen from the table, the ending for the second person plural conjunct is the usual /-əθ′/, but I have not been able to uncover any examples of the absolute. The imperfect ends in /-əθ′a∅′/, and although the orthography of the example here is ambiguous, I assume the regular i-colour, which is entirely plausible from the spelling. The final table in this subsection is devoted to the third person plural.

Table 69. Active 3rd person singular flexion of i-colour pattern strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
gaibid	'takes'	BII	S2	XVX-	gaβ′-
con·gaib	'contains'	BII	S2	XVX-	·gaβ′-
		Absolute			
gaβ′-əd′	→	gaβ′əd′	*gaibit*		Sg204a7
		Relative			
gaβ′-əd′a∅′	→	gaβ′d′a∅′	*gaibde*		Ml7a16
		Conjunct			
·gaβ′-əd	→	·gaβ′ad	*con·gaibet*		Sg53a10
		Imperfect			
·gaβ′-əd′əs′	→	·gaβ′d′əs′	*nos·gaibtis*		Ml2b7

Like the third person singular, the third person plural presents no apparent problems for these verbs. The absolute ending is /əd′/, the relative one /-əd′a∅′/, the conjunct /-əd/, and the imperfect /-əd′əs′/, in this case clearly with an i-colour stem-final consonant.

The above subsections have outlined the present flexion of the three main classes of non-nasal strong verbs in Old Irish: the alternating colour pattern in 5.1.2.1,

[270] With neuter third person singular infix pronoun /-$ð^{L}$/.

the a-colour pattern in 5.1.2.2, and the i-colour pattern in this subsection. The next subsection turns to the other large class of strong verbs, the nasal presents.

5.1.3. Flexion of nasal presents

Thurneysen distinguishes three different classes of strong verbs in which a nasal consonant is infixed to the root to form the present stem. In his BIII class, designated S1d by McCone, the nasal is infixed into an X_1VX_2- root, i.e. X_1V-N-X_2-, with a resulting present stem shape XVNX-. This type of nasal infix present is discussed in 5.1.3.1. The second class Thurneysen distinguishes is his BIV class, in which an a-colour nasal is infixed to an XV- root to form the present stem, yielding the stem shape XV-N-. In his BV class, the nasal has i-colour or u-colour rather than a-colour. These two classes are merged by McCone (*EIV*: S3), and I have followed that practice here,. These verbs are examined in subsection 5.1.3.3 below. A third class of nasal presents is not identified by either Thurneysen and McCone, but I believe can be justified. Like the first group above, the root shape of these verbs is X_1VX_2-, but X_2 is a sonorant rather than an obstruent, and rather than the nasal being infixed before X_2, it is rather infixed after, i.e. XVX-N-, resembling more the second groups of verbs above. The resulting stem shape is thus XVXN-. These verbs are discussed in subsection 5.1.3.2.

5.1.3.1. Flexion of nasal presents with obstruent final XVX- roots

There are two categories of nasal presents for verbs with X_1VX_2- roots. In the first, under discussion here, X_2 is a coronal or guttural obstruent,[271] and the nasal is infixed after the vowel and before the final obstruent of the root, i.e. X_1V-N-X_2-, yielding the

[271] It is not necessarily a straightforward matter to determine whether the final obstruent is a stop or fricative. For the root *find*- the final obstruent is clearly a stop, as it is generally written <nn>. For the roots *rond*- and *bond*-, it is clearly not, as it is never written in that way. The roots *tong*-, *long*-, *dlong*-, *bong*-, and *ding*- would appear to point towards a fricative rather than a stop, as they are consistently written with <g> rather than <c> (the compounds *con·utaing* and *ar·utaing* excepted), also in other stem formations where there is no nasal infix. Added to this, there are occasional later examples in other stem formations, for *dlongaid* and *dingid* at least, where <gh> is written instead of <g>, clearly pointing towards the fricative. On the back of this evidence, I have tentatively written /ɣ/ rather than /g/ in the examples below.

stem shape X_1VNX_2-. These verbs are discussed in this subsection. In the second category, X_2 is a sonorant and the nasal is infixed after the sonorant, i.e. X_1V-X_2-N-, giving the stem shape XVXN-. These verbs are discussed in subsection 5.1.3.2, below.

In the group of nasal presents under discussion here, where the nasal is infixed between the root vowel and the final obstruent, which is always either coronal or guttural, the present stem shape is XVNX-. These verbs behave in quite a uniform manner with regard to the formation of other stems: they invariably take an s-subjunctive and future and a reduplicated preterite.

Thurneysen groups these verbs in his BIII class and states that they are "inflected like BI" (*GOI*: §550). McCone, on the other hand, puts them in his S1d class and states that "*dingid* [...] and its compounds conform to the S1a type" (the alternating pattern strong verbs discussed in 5.1.2.1 above), whereas the other examples 'would be S1c presents if they did not lose their *n* in the other stems' (McCone 1987: 31), i.e. they have the a-colour pattern of strong verbs covered in 5.1.2.2. The generalisation is thus that verbs of this class with an initial i-colour consonant, i.e. effectively *dingid* and its compounds, are conjugated according to the alternating pattern, while the other verbs in this class, which begin with u-colour and have a low vowel, are conjugated like verbs of the strong a-colour pattern (see also Stifter 2006: 91).

McCone's generalisation largely appears to hold in the data available to me, although it should be noted that there is minimal attestation of forms from the second person singular or third person singular absolute, where the difference between the alternating pattern and the a-colour pattern is most apparent. Furthermore, there are very early examples of i-colour even for verbs of this class with <o>, such as the imperfect passive plural form *in·dloingtis*, from *in·dloing* 'cleaves', in the *Book of Armagh* (Arm175b1), one of the oldest texts available to us. This suggests that a tendency for these verbs to move towards the alternating pattern, or even the i-colour pattern, is very early indeed.

Alternating colour examples of this class include *dingid* 'thrusts, drives in' and its compounds, most notable as *for·ding* 'oppresses'. For the a-colour pattern, examples include *dlongaid* 'splits, cuts away' and its compound *in·dloing* 'cleaves, separates'; *tongaid* 'swears an oath' and its compounds,[272] such as *do·toing* 'denies by oath',

[272] J. Koch (1992b: 257-8) suggests that the nasal in this verb may have originally been part of the root, rather than a present infix. Given the similarity in shape between *tongaid* on the one hand and verbs with

imm·toing ‘swears around’, *ar·toing* ‘swears for’, and *for·toing* ‘proves by oath’; *bongaid* ‘breaks, cuts’ and its compounds *con·boing* ‘breaks’ and *do·boing* ‘plucks away’; *fo·loing* ‘supports’ and *in·loing* ‘joins, unites’; *as·boind* ‘refuses’; and *rondaid* ‘colours, dyes’.

Although Thurneysen lists *ro·finnadar* ‘gets to know’ as a BV verb (see subsection 5.1.3.3, below),[273] I see no formal reason why it should not be included in this class. Like the other verbs here, it has an s-subjunctive and future. One differentiating factor from the rest of the verbs in this group however is the fact that the nasal infix in this verb has u-colour rather than a-colour.

There are no attested second person forms for verbs of this class that I have come across, and there are other gaps in the paradigm too, such as the third person absolute forms. However, there are enough examples to deal separately with the first person singular, the third person singular, the first person plural, and the third person plural. A table giving forms of the first person singular is given below.

Table 70. 1st person singular flexion of XV-N-X- nasal presents

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
tongaid	‘swears’	BIII	S1d	XVX-	t°a-n-ɣ- → t°aŋɣ-
ar·toing	‘swears for’	BIII	S1d	XVX-	·t°a-n-ɣ- → ·t°aŋɣ-
in·dloing	‘cleaves’	BIII	S1d	XVX-	·d°l°a-n-ɣ- → ·d°l°aŋɣ-
for·ding	‘oppresses’	BIII	S1d	XVX	·d′ə-n′-ɣ- → ·d′əŋ′ɣ′-
			Absolute		
t°aŋɣ-ə∅°	→	t°an°ɣ°ə∅°		*tongu*	LU5135
			Conjunct		
·d°l°aŋɣ-∅°	→	·d°l°əŋ°ɣ°		*in·dlung*	Sg15a5
·t°aŋɣ-∅°	→	·t°aŋ°ɣ°		*ar·tung*	LU5504
			Imperfect		
·d′əŋ′ɣ′-əN′	→	·d′əŋ′ɣ′əN′		*for·ndinginn*	Ml115a16

The ending for the absolute first person singular is /-ə∅°/, attested many times as part of the oath *tongu do día toinges mo thúath* ‘I swear to the god my people swear by’ (see Ó hUiginn 1989 and J. Koch 1992b), particularly in the Ulster Cycle tales. The lack of vowel raising may result from the fact that the examples known to me are all relatively

an original nasal infix in the present stem, such as *bongaid*, *longaid*, and *dlongaid*, reinterpretation of the root nasal in *tongaid* as a present stem infix is not implausible, especially seeing as the difference between the two classes would be neutralised in most other stem formations.

[273] McCone (1987) does not actually comment on the classification of this verb, but it is listed as S3 (i.e. among the nasal presents with XV- roots discussed in 6.3.3) in Stifter (2006: 153).

late, and could thus have been levelled out. The conjunct ending appears quite consistently as /-∅˚/ and the examples I have come across do show the expected raising found also in the alternating pattern of strong verbs (5.1.2.1). The imperfect ending is the usual /-əN′/. The following table gives forms of the third person singular.

Table 71. 3rd person singular flexion of XV-N-X- nasal presents

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
longaid	'banishes'	BIII	S1d	XVX-	L˚a-n-ɣ- → L˚aŋɣ-
tongaid	'swears'	BIII	S1d	XVX-	t˚a-n-ɣ- → t˚aŋɣ-
rondaid	'colours, dyes'	BIII	S1d	XVX-	r˚a-n′-ð- → r˚an′ð′-
in·dloing	'cleaves'	BIII	S1d	XVX-	·d˚l˚a-n-ɣ- → ·d˚l˚aŋɣ-
fo·loing	'supports'	BIII	S1d	XVX-	·L˚a-n-ɣ- → ·L˚aŋɣ-
con·boing	'breaks'	BIII	S1d	XVX-	·b˚a-n-ɣ- → ·b˚aŋɣ-
con·utaing	'builds'	BIII	S1d	XVX-	·∅˚əd˚ə-n-g- →·∅˚əd˚əŋg-
ro·finnadar	'gets to know'	BIII	S1d	XVX	·φ′ə-n˚-d′- → ·φ′əN˚-
			Relative		
L˚aŋɣ-əs	→	L˚aŋɣəs		*longais*	AIDi 18§19
R˚an′ð′-əs	→	R˚an′ð′əs		*roindes*[274]	LU3826
			Conjunct		
·d˚l˚aŋɣ-∅′	→	·d˚l˚aŋ′ɣ′		*as·dloing*[275]	Ml48c32
·b˚aŋɣ-∅′	→	·b˚aŋ′ɣ′		*con·boing*	Wb4d15
·L˚aŋɣ-∅′	→	·L˚aŋ′ɣ′		*fo·loing*	Wb29d17
·∅˚əd˚əŋg-∅′	→	·∅˚əd˚əŋ′g′		*con·utainc*[276]	Wb10b28
			Deponent conjunct		
·φ′əN˚-əθr	→	·φ′əN˚aθar		*ru-d·finnadar*[277]	Ml46c24
			Imperfect		
·t˚aŋɣ-əθ	→	·taŋɣaθ		*no·thongad*[278]	Ml36a20

I am not aware of any straightforward examples of the absolute, although there is the form *toingthi* (DIL 41385) with a third person singular masculine suffix pronoun. There are cases of the relative, with the usual /-əs/ and for the conjunct, the ending can be considered /-∅′/ for the a-pattern exemplars, and null for the alternating pattern ones, as in the alternating pattern and a-colour pattern strong verbs discussed in 5.1.2.1 and 5.1.2.2, above. The imperfect ending is the regular /-əθ/. The following table shows forms of the first person plural.

[274] Here exhibiting the i-colour appropriate to verbs of the alternating and i-colour patterns.
[275] With preverb *as·* for *in·*.
[276] This verb is a compound of *dingid*, i.e. *con-us-ding-*.
[277] With neuter third person singular infix pronoun /-ð^{L}/.
[278] The initial of the stem is lenited here as it is relative.

Table 72. 1st person plural flexion of XV-N-X- nasal presents

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
tongaid	‘swears’	BIII	S1d	XVX-	t°a-n-ɣ- → t°aŋɣ-
fo·loing	‘supports’	BIII	S1d	XVX-	·L°a-n-ɣ- → ·L°aŋɣ-
			Absolute		
t°aŋɣ-əm′ə∅′	→	t°aŋɣmə∅′		*tongmai*	YBL946.75
			Conjunct		
·L°anɣ-əμ	→	·L°anɣaμ		*fo·llongam*	Wb14b15

The ending for the absolute first person plural is straightforwardly /-əm′ə∅′/, while that of the conjunct is /-əμ/. The following table gives examples from the third person plural.

Table 73. 3rd person plural flexion of XV-N-X- nasal presents

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
tongaid	‘swears’	BIII	S1d	XVX-	t°a-n-ɣ- → t°aŋɣ-
for·ding	‘oppresses’	BIII	S1d	XVX	·d′ə-n′-ɣ- → ·d′əŋ′ɣ′-
fo·loing	‘supports’	BIII	S1d	XVX-	·L°a-n-ɣ- → ·L°aŋɣ-
ro·finnadar	‘gets to know’	BIII	S1d	XVX	·φ′ə-n°-d′- → ·φ′əN°-
			Relative		
t°aŋ′ɣ′-əd′a∅′	→	t°aŋ′ɣ′d′a∅′		*toingte*[279]	LU5183
			Conjunct		
·d′əŋɣ-əd	→	·d′əŋɣad		*for·dengat*	Ml29a13
·L°aŋɣ-əd	→	·L°aŋɣad		*fo·longat*	Ml35a3
			Deponent conjunct		
·φ′əN°-ədr	→	·φ′əN°adar		*nad·finnatar*	Ml99b10

No absolute forms of the third person plural are known to me, and the only relative form I have come across (cited above), is late and has an i-colour stem-final consonant, but the usual ending /-əd′ə∅′/. The conjunct forms have the ending /-əd′/.

This subsection has outlined the present flexion of one group of nasal presents with XVX- roots, specifically those in which the second consonant of the root is an obstruent, before which the nasal is infixed. In the group of verbs discussed in the next section, the second consonant of the root is rather a sonorant, and the characteristic nasal is infixed after this to form the present stem.

[279] Even in verbs with alternating colour present stems, and of course in those with a-colour present stems, the third person plural has a-colour. The i-colour of this form, which occurs many times in LU is thus unexpected and must be considered innovatory, and reflective of this verb moving over entirely to the i-colour pattern (for this verb in Middle Irish see Fattovich 2010: 114).

5.1.3.2. Flexion of nasal presents with sonorant final XVX- roots

In a small group nasal presents, the root final consonant is a sonorant. In these cases, the nasal infix is inserted after the sonorant, i.e. X_1VX_2-N-, yielding a stem shape X_1VX_2N-, where X_2 is a sonorant. The few examples include *ernaid* 'bestows, grants'; *sernaid* 'arrays, disposes', and its compound *con·sern* 'applies oneself'; *at·baill* 'dies'; as well as *marnaid* 'betrays, deceives', which is not attested in the present in the glosses.[280] With regard to the formation of the other stems, all of these verbs take an a-subjunctive, and while *ernaid* has an irregular future and a reduplicated preterite, the other three verbs take an ē-future and a t-preterite. It should also be noted that both *marnaid* and *at·baill* exhibit colour alternation in the formation of the other stems, having subjunctive and future stems with initial i-colour, and, in the case of *marnaid*, initial i-colour in the preterite stem as well.

The inclusion of *at·baill* in this group is due to the common analysis of <ll> as reflecting underlying /-l-n-/ (*GOI*: §594; McCone 1987: 31). In the present, <ll> is a common spelling of the forms of this verb, although it should be noted that single <l> also occurs (Wb4d15; Sg4b6; Ml57a10 etc.). However, outside of the present tense, the geminate spelling <ll> is never found, which lends support to this analysis, without which the geminate spellings in the present would be difficult to explain.

It is interesting that the standard sources do not deal with this class in a uniform manner. Thurneysen (*GOI*: §551) considers *ernaid* and *sernaid* to belong to his BIV class and *marnaid* and *at·baill* to belong to his BV class (*GOI*: §552). However, he then later discusses *at·baill* among the BIV verbs. McCone, on the other hand, lists *marnaid* and *at·baill* in his S1d class, alongside those nasal presents discussed above in which the nasal is infixed before a final obstruent. I have considered them a separate class because while they are associated with an XVX- root, like the nasal presents discussed in 5.1.3.1 above, but the position of the nasal infix is different, and more closely resembles the situation of the nasal presents with XV- roots discussed in 5.1.3.3, below.

The attestation is too sparse to make any definitive statement about the conjugation of these verbs, or indeed whether it was even uniform. The evidence is broadly compatible with either an a-colour or an alternating colour pattern of inflexion.

[280] One could also add the deponent *tolnaithir* 'pleases' to this group.

The third person singular imperfect form *no·sernad* (SR2957) would appear to point to the a-colour pattern, but is late. On the other hand, the third person plural imperfect *at·baildis* (BDD 126), suggests rather the alternating pattern. Following Thurneysen (*GOI*: §594), I have assumed an a-colour pattern, in line with the other nasal presents discussed in this section.

There are so few examples that it hardly makes sense to subdivide them according to person and number. The table below thus shows present forms of this class where they are attested.

Table 74. Flexion of XVX-N- nasal presents

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
at·baill	'dies'	BV	S1d	XVX-	·bal-n- → ·baL-
ernaid	'bestows, grants'	BIV	S1d	XVX-	∅′ar-n- → ∅′arn-
sernaid	'arrays, disposes'	BIV	S1d	XVX-	s′ar-n- → s′arn-
con·sern	'applies oneself'	BIV	S1d	XVX-	·s′ar-n- → ·s′arn-
Absolute 3rd person plural					
s′arn-əd′	→	s′arnəd′		*sernait*	Fél Aug31
Conjunct 3rd person singular					
·baL-∅′-	→	·baL′		*ad·baill*	Wb16b11
·∅′arn-∅′-	→	·∅′ar′n′		*ni·ern*	Sg197b10
Conjunct 1st person plural					
·s′arn-əμ	→	·s′arnaμ		*con·sernam*	Ml35c36
Conjunct 3rd person plural					
·s′arn-əd	→	·s′arnəd		*ní·sernat*	Ml31a19
·baL-əd	→	·baLat		*at·ballat*	Wb9d5
Imperfect 3rd person singular					
·s′ərn-əθ	→	s′arnaθ		*no·sernad*	SR2957
Imperfect 3rd person plural					
·baL′-əd′əs′	→	·baL′d′əs′		*at·baildis*	BDD 126

The endings of the above forms are as one might expect: /-əd′/ for the absolute third person plural; /-∅′/ for the conjunct third person singular (possibly null for *ni·ern*, in line with the verbs discussed in 5.1.3.3, although the spelling is ambiguous on this point); /-əμ/ for the conjunct first person plural; /-əd/ for the conjunct third person plural; and for the imperfect, third person singular /-əθ/ and third person plural /-əd′əs′/.

The next subsection examines a far more numerous class of verbs, namely those nasal presents with XV- roots.

5.1.3.3. Flexion of nasal presents with XV- roots

These verbs have an XV- root shape and are characterised by a nasal infix after the root in the present tense. McCone (1987) categorises all of these verbs together in his S3 class, while Thurneysen (1946) distinguishes between a BIV class, which includes those verbs in which the nasal infix has a-colour, and a BV class in which it has u-colour, or in one case, i-colour. However, these verbs form the other stems in a quite consistent manner: they take an a-subjunctive, a reduplicated future and a reduplicated preterite.

The a-colour pattern is by far the most common and includes verbs such as *benaid* 'strikes', *renaid* 'sells', *lenaid* 'remains, attaches to', *crenaid* 'buys', *glenaid* 'sticks', *tlenaid* 'takes away, steals' and their compounds, as well as compounds based on the root *fen*-, such as *for·fen* 'finishes' and *imm·fen* 'encloses'.

Much less common are verbs in which the nasal infix has u-colour. Examples are limited to *do·lin* 'flows', *ara·chrin* 'decays, fails', and compounds based on the almost unattested simple verb *gninid* (DIL 26230), such as *as·gnin* 'recognises'[281] and *eter·gnin* 'understands'.[282] Vendryes (1908: 172) considers the nasal to have i-colour in this group of verbs, possibly on the basis of first person singular forms such as *do·linim* and *ara·chrinim* (see below), in which the spelling is ambiguous. It should be noted in this regard that strong verbs of the alternating pattern (5.1.2.1), have an i-colour stem final consonant before the ending /-əmʹ/, even though their stems typically show final u-colour in the first person singular.

In one verb in this class, *ro·cluinethar* 'hears', the nasal infix does have i-colour. However, its flexion is deponent, so for this reason it is discussed alongside the other present tense forms with deponent flexion in 5.2.1.[283]

The attestation of nasal presents with XV- roots verbs is quite good, and often reasonably early, but there are still a number of gaps in the paradigm, particularly in the first person plural. For this reason, I have treated the singular and plural together for the

[281] Also attested with other preverbs such as *as·*, *in·*, and *con·*, always with the same meaning. See subsection 4.2.2 for details on variability in prenuclear preverbs.
[282] Thurneysen (*GOI*: §552) also lists *ro·finnadar* with these verbs, but because of its root shape I have included it among the nasal presents of XVX- roots with final obstruent, discussed in 5.1.3.1, above.
[283] For Vendryes (1908: 172) the nasal has i-colour also in the preceding verbs, i.e. *do·lin*, *as·gnin* etc. This contention is not credible in light of the orthography of the surviving forms, although see the comments on the first person singular, below.

first and second persons in the exposition that follows. The table below shows forms of the first person.

Table 75. 1st person flexion of XV-N- nasal presents

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
benaid	'strikes'	BIV	S3	XV-	b′ə-n- → b′an-
for·fen	'finishes'	BIV	S3	XV-	·φ′ə-n- → φ′an-
fris·ben	'heals'	BIV	S3	XV-	·b′ə-n- → b′an-
as·ren	'pays out, expends'	BIV	S3	XV-	·R′ə-n- → R′an-
do·lin	'flows'	BV	S3	XV-	L′ə-n˚- → ·L′ən˚-
ara·chrin	'decays, fails'	BV	S3	XV-	x′r′ə-n˚- → ·x′r′ən˚-
as·gnin	'recognises'	BV	S3	XV-	g′n′ə-n˚- → g′n′ən˚-
Absolute 1st person singular					
b′an-əm′	→	b′anəm′	*benim*		Thes.ii 42.7
Conjunct 1st person singular					
·fan-∅˚	→	·fən˚	*for·fiun*		Sg143a4
·b′an-əm′	→	·b′anəm′	*fris·benaim*		LCC30[284]
·L′ən˚-əm′	→	·L′ən˚əm′	*do·linim*		Sg158a1
·x′r′ən˚-əm′	→	·x′r′ən˚əm′	*ara·chrinim*		Sg145b1
·g′n′ən˚-əm′	→	·g′n′ən˚-əm′	*asa·gninaim*		Sg146b16
·g′n′ən′-ə∅˚	→	·g′n′ən′ə∅˚	*ath·gniniu*		L&C 16.4

For the absolute of the present first person singular, I have not uncovered any examples in /-ə∅˚/, only /-əm′/, although instances of the absolute are hardly numerous for this class of verbs. For the conjunct, the situation is not straightforward. The most common ending would appear to be /-əm′/, but there is at least one example of the ending /-∅˚/, *for·fiun*, with final u-colour and the raising familiar from many strong verbs, particularly those with the alternating pattern, discussed in 5.1.2.1.

As stated above, verbs such as *do·lin* and *ara·chrin* the stem-final nasal infix probably has u-colour throughout, but examples such as *do·linim* and *ara·chrinim* are ambiguous, which may have motivated Vendryes (1908: 172) to claim that the nasals in this class have i-colour. I am only aware of one instance of the ending /-ə∅˚/, and that certainly with an i-colour nasal, in the form *ath·gniniu*, where it rhymes in poetry with *con·gairiu*, first person singular of *con·gair* 'calls, summons'. For this poetic usage, see Thurneysen (*GOI*: §562). I know of no instances of the imperfect. The following table shows forms of the second person.

[284] Carey (2000).

Table 76. 2nd person flexion of XV-N- nasal presents

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
benaid	‘strikes’	BIV	S3	XV-	b′ə-n- → b′an-
as·ren	‘pays out, expends’	BIV	S3	XV-	·R′ə-n- → R′an-
ar·ren	‘pays for another’	BIV	S3	XV-	·R′ə-n- → R′an-
ara·chrin	‘decays, fails’	BV	S3	XV-	x′r′ə-n˚- → ·x′r′ən˚-
2nd person singular absolute					
b′an-ə∅′	→	b′anə∅′	*benai*		TBC3592
2nd person singular conjunct					
·R′an-∅′	→	·R′anə∅′	*as·renai*		Ml44a6
2nd person plural conjunct					
·R′an-əθ′	→	·R′anəθ′	*er·renaid*		Ml20c2

The second person forms are not numerous but present no problems. The active second person singular ending is /-ə∅′/, for both absolute and conjunct, as in the a-colour and i-colour patterns of strong verbs. The second personal plural ending is /-əθ′/. I am not aware of any tokens of the imperfect. The following table shows third person singular.

Table 77. 3rd person singular flexion of XV-N- nasal presents

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
benaid	‘strikes’	BIV	S3	XV-	b′ə-n- → b′an-
lenaid	‘remains, attaches to’	BIV	S3	XV-	L′ə-n- → L′an-
crenaid	‘buys’	BIV	S3	XV-	k′r′ə-n- → k′r′an-
for·fen	‘finishes’	BIV	S3	XV-	·φ′ə-n- → φ′an-
fris·ben	‘heals’	BIV	S3	XV-	·b′ə-n- → b′an-
as·ren	‘pays out, expends’	BIV	S3	XV-	·R′ə-n- → R′an-
do·lin	‘flows’	BV	S3	XV-	L′ə-n˚- → ·L′ən˚-
ara·chrin	‘decays, fails’	BV	S3	XV-	x′r′ə-n˚- → ·x′r′ən˚-
Absolute					
b′an-əθ′	→	b′anəθ′	*benaid*		Ml46d4
L′an-əθ′	→	L′anəθ′	*lenaid*		Sg9b17
Relative					
k′r′an-əs	→	k′r′anas	*crenas*		Wb29d23
Conjunct					
·φ′an-	→	·φ′an	*for·fen*		Ml64c2
·b′an-	→	·b′ən	*fris·ben*		Ml125c4
·L′ən˚-	→	·L′ən˚	*du·lin*		Ml68b11
·x′r′ən˚-	→	·x′r′ən˚	*ara·chrin*		Ml57c12
Imperfect					
·R′an-əθ	→	·R′anaθ	*as·renad*		Ml32b10

The absolute ending for the third person singular is, as usual, /-əθʹ/. For the conjunct, these verbs consistently have a null ending, although the forms with final u-colour are spelled in an ambiguous fashion, and it is possible that the final consonant in these forms had rather i-colour, as already discussed under the first person singular. Indeed, the synchronic motivation for an i-colour final consonant is even stronger here than in the first person, as /-∅ʹ/ occurs frequently elsewhere in the verbal system as a conjunct third person singular ending. However, I have here favoured the null hypothesis in my representations. The deponent conjunct ending is /-əθr/, while the imperfect is /-əθ/. The following table shows third person plural forms of the class of verbs under discussion.

Table 78. 3rd person plural flexion of XV-N- nasal presents

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
lenaid	'remains, attaches to'	BIV	S3	XVX-	Lʹə-n- → Lʹan-
benaid	'strikes'	BIV	S3	XVX-	bʹə-n- → bʹan-
renaid	'sells'	BIV	S3	XVX-	Rʹə-n- → Rʹan-
as·ren	'pays out, expends'	BIV	S3	XVX-	·Rʹə-n- → Rʹan-
do·lin	'flows'	BV	S3	XVX-	Lʹə-n˚- → ·Lʹən˚-

Absolute				
Lʹan-ədʹ	→	Lʹanədʹ	*lenit*	Wb29a23
bʹan-ədʹ	→	bʹanədʹ	*benait*	Fél Jun 30
Relative				
Rʹan-ədʹa∅ʹ	→	Rʹandʹa∅ʹ	*rendæ*	Ml120d1
Conjunct				
·Rʹan-əd	→	·Rʹanəd	*as·renat*	Sg27a2
·Lʹən˚-əd	→	·Lʹən˚əd	*du·linat*	Ml56a14
Deponent conjunct				
Imperfect				
·Rʹan-ədʹəsʹ	→	·Rʹandəsʹ	*as·rentais*	O'C 257

The absolute ending for the third person plural is /-ədʹ/, while the ending of the relative is /-ədʹa∅ʹ/. Both of these are entirely regular. The endings /-əd/ for the conjunct and that /-ədʹəsʹ/ for the imperfect are similarly as expected. The second vowel in *do·linat* clearly shows that the nasal of this form did not have i-colour, as if it did, it would regularly appear as <e>, rather than as <a> (see 3.1.3.1).

5.1.4. Present flexion of hiatus verbs

There are two principal categories of verbs with XV- roots. In the first category, explored in 5.1.3.3, above, a nasal is infixed between the root and the person endings in the present tense. The second category of verbs with XV- roots are known as hiatus verbs, because while the present conjunct third person singular surfaces with a long vowel or diphthong, e.g. *do·gní* 'does, makes', forms with monosyllabic vowel initial endings instead exhibit vowels in hiatus, e.g. *gniid*. Thurneysen groups these verbs together as one class (*GOI*: AIII), while McCone (1987) differentiates them on the basis of their root vowel, distinguishing those with <a> in the root, those with <i> and those with <e, o, u> (*EIV*: H1, H2, H3 respectively).

This class is quite diverse in terms of the formation of stems other than the present, and in some respects they exhibit features of both weak and strong verbs to varying degrees. However, the similarities with weak verbs, e.g. some hiatus verbs take an f-future, are by no means outweighed by the fact that they are all primary verbs, and that most of them also show features of strong verb flexion. This means that Thurneysen's grouping of them alongside the weak verbs is hardly justified.

However, McCone's classification of these verbs is not satisfactory either, particularly in his setting up of a type of *wastebasket* H3 class including those verbs with <e, o, u> in the root. These vowels do not form a natural class, and although it is true that the verbs with roots in <a> (his H1 class) and those with roots in <i> (his H2 class) more frequently show strong verb flexion than those with roots in <e, o, u>,[285] there is considerable variation within these categories.

Historically, hiatus verbs derive from roots of vowel plus a semivowel, either *j, *w, or *h. This variety in origins is part of the reason why the synchronic status and classification of hiatus verbs is so difficult to determine. Another consideration is the very uneven attestation of these verbs. Some, such as the various forms of the substantive verb, of *gniid* 'does, makes' and its compounds, and of *ad·cí* 'sees', are very common, but it is not clear that they are typical of the group as a whole. Indeed, *biid*

[285] Verbs in <e> are particularly poorly attested. Only *sceid* 'vomits', *sreid* 'scatters, casts' and their compounds occur in Old Irish.

'does be' and *gniid* 'does, makes', as well as their compounds, occasionally show aberrant behaviour, particularly in the third person singular relative, discussed below.[286]

As time goes on, there is a tendency for the roots of hiatus verbs to be remodelled on the basis of the third person singular conjunct, where a long vowel occurs regularly. This appears to occur particularly often with verbs whose roots have initial u-colour, which often show forms reflecting a root /C°V∅′-/, remodelled on the conjunct third person singular. It is often difficult on the basis of the surviving evidence to determine the status of particular hiatus roots with any certainty.[287] I have thus considered hiatus verbs to have a simple /XV-/ stem in the present unless there is compelling evidence to the contrary.

In spite of the difficulties regarding this group, I believe the ternary analysis of Old Irish phonology deals with the data very well for hiatus verbs. In the binary and traditional systems, description of the conjugation of hiatus verbs requires the statement of a large number of operations whereby short vowels become long vowels or diphthongs. In the ternary system, in contrast, the conjugation of hiatus verbs in the present can be stated much more simply, by the addition of the same person and number endings which are found with other verbs. In fact, alternations between vowels in hiatus in absolute forms and long vowels or diphthongs in conjunct forms provide excellent evidence for the phonological structure of long vowels and diphthongs (see subsection 3.2.3.3).

While some hiatus verbs are very common, unfortunately not all possible permutations of consonant colour plus vowel height are attested outside the third person singular. The best represented shape is /X′ə-/, which characterises *ciid* 'weeps', and *ad·cí* 'sees' and also *biid* 'does be', *gniid* 'does, makes' and their compounds (particularly *do·gní* 'does, makes'). There are much fewer verbs with the root form /X′a-/, but a small number of forms are available for *sceid* 'vomits' and *sreid* 'scatters, casts' and verbs built on the same roots.

[286] The data for *ad·cí* are not entirely incompatible with a root /k′əh′-/, which might be expected on the basis of the possible survival of /h/ in *ar·neat* (see subsection 5.1.2.1). For further discussion, see subsection 5.2.2.1, below.

[287] Zair's (2009) account of the analogical remodelling of the substantive verb forms with what he holds to be problematic long vowels, e.g. in the first person plural absolute, is diachronically plausible, but the form he cites as an example of a 'regular' long vowel in the same position, i.e. **bámmi*, from *baid* 'dies', is not, to my knowledge, attested.

For hiatus verbs with the root shape /Xa-/ a number of forms are found for *raid* ‘rows’, as well as *snaid* ‘swims’, and their compounds. Conjunct forms for this hiatus verbs with this root shape are particularly well attested because of the inclusion in this category of the present indicative of the substantive verb, *ad·tá*.

For the root shape /X°ə-/, examples come from *luid* ‘moves’[288] and *bruid* ‘smashes’ as well as a number of compounds based on the same root as *luid*, e.g. *as·luí* ‘escapes’. For /X°a-/, the best attested root is probably that found in *soid* ‘turns’ and its compounds, but there are also numerous examples of *foid* ‘overnights’ and a number of other verbs, not all of which have roots which are attested as simplex verbs, e.g. *con·oí* ‘protects’. As mentioned above, hiatus verbs with initial u-colour are particularly liable to reinterpretation as having /X°V∅′-/ roots. They also generally behave like weak verbs in terms of the formation of other stems, which is part of McCone’s rationale for assigning them as a separate class.

To my knowledge there are only two deponent verbs belonging to the hiatus class, i.e. *fo·luathar* ‘flies’ and *for·luathar* ‘flutters’. There is also one case of deponent flexion with the of the verb *luid* ‘moves’. All of these cases, which have the same root, i.e. /L°ə-/, are dealt with in 5.2.1, below, alongside other verbs with the deponent flexion.

In spite of the variety in hiatus verbs, I have decided to treat them as a unitary class, in what follows, albeit one with considerable internal variation, particularly with regard to the formation of the non-present stems. The following sections illustrate the conjugation of these verbs in the present for each person and number. I include more examples than usual in order to illustrate both the synchronic variety and the changes they undergo between the Old Irish and Middle Irish periods. In particular, I have attempted to give at least one example with each of the three consonant colours in initial position for each category. So as not to obscure the exposition with this profusion of examples, the paragraphs on the third person singular and plural have been split, dealing with absolute and conjunct flexion separately.

The first table, below, looks at the present first person singular forms of hiatus verbs.

[288] The narrative preterite of the verb ‘to go’ is also spelled *luid* in the third person singular, but it does not behave as a hiatus verb.

Table 79. 1st person singular flexion of hiatus verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
biid	‘does be’	AIII	H2	XV-	b′ə-
liid	‘imputes’	AIII	H2	XV-	L′ə-
ad·tá	‘is’	AIII	H1	XV-	·ta-
ad·cí	‘sees’	AIII	H2	XV-	·k′ə-
ad·noí	‘entrusts’	AIII	H3	XV	N°a-
luid	‘moves’	AIII	H3	XV-	L°ə-

Absolute				
b′ə-ə∅°	→	b′ə∅°ə∅°	*biuu*	Wb16d8
L′ə-əm′	→	L′ə∅′əm′	*liim*	Wb10a1

Conjunct				
·ta-∅°	→	·ta∅°	*i·táu*[289]	Wb32a10
·k′ə-∅°	→	·k′ə∅°	*at·chíu*	LU4535
·b′ə-∅°	→	·b′ə∅°	*no·mbíu*[290]	Wb20a3
·N°a-ə∅°	→	·N°ə∅°ə∅°	*ad·nuu*	LU9696
·N°a-əm′	→	·N°a∅′əm′	*at·noim*	O’Cl 1300

Imperfect				
·L°ə-əN′	→	·L°ə∅′əN′	*no·luind*	LU1325
·b′ə-əN′	→	·b′ə∅′əN′	*no·mbíinn*	Ml108b1

In the absolute, both /-ə∅°/ and /-əm′/ are found as endings for the first person singular, as in many of the other present tense classes explored in previous sections. The examples here both come from verbs with initial i-colour, however, and unfortunately I am not aware of any examples of the first person singular absolute from verbs with initial u-colour or a-colour.

In the conjunct, the most frequent ending is /-∅°/. Unfortunately, I have not been able to uncover examples which would argue for or against the vowel raising frequently found after this person ending, such as that which occurs with the strong verbs discussed in 5.1.2.1. Such vowel raising is found however with the ending /-ə∅°/ in *ad·nuu*, which although unusual, occurs three times in the space of several lines, in each case confirmed by the metre (see Stokes 190216). Furthermore, the example given of the ending /-əm′/ is not particularly secure (DIL 522). The imperfect ending is, as usual /-əN′/, but unfortunately, I have been unable to finda any examples for verbs with initial a-colour.

[289] Already in the Würzburg glosses, spellings with <ó> are much more frequent than this sole example in <áu>.
[290] With particle /N°ə-/, nasalised as relative.

The following table examines second person forms of hiatus verbs in the present and imperfect.

Table 80. 2nd person singular flexion of hiatus verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
ciid	'does be'	AIII	H2	XV-	k′ə-
ad·tá	'is'	AIII	H1	XV-	·ta-
imm·rá	'navigates'	AIII	H2	XV-	·Ra-
do·gní	'does, makes'	AIII	H2	XV-	·g′n′ə-
ad·cí	'sees'	AIII	H2	XV-	·k′ə-
imm·soí	'turns around'	AIII	H3	XV-	·s°a-

Absolute				
k′ə-ə∅′	→	k′ə∅′ə∅′	*cíi*	RC12[291]
Conjunct				
·ta-∅′	→	·ta∅′	*at·tái*	Ml110d15
·Ra-∅′	→	·Ra∅′	*imme·rái*	IB §37
·g′n′ə-∅′	→	·g′n′ə∅′	*do·gni*	Wb6c16
·k′ə-∅′	→	·k′ə∅′	*ad·chí*	Fél Pro. 150
·s°a-∅′	→	·s°a∅′	*imme·soi*	Ml111a6

The endings of the second person singular are quite unproblematic for this class of verbs. The absolute ending is /-ə∅′/, while the conjunct ending is regularly /-∅′/.

At this point, it is worth recapping on what was explored in chapter 3 with respect to vowels in hiatus. These can be understood in terms of a frame XV∅VX, and show behaviour typical of both short and long vowels, as discussed in section 3.2.3.4. When a vowel-initial formative is added to a monosyllabic stem ending in a vowel, an excrescent consonant repairs the resulting illicit **VV structure (3.3.2.3). To take examples from the hiatus verb paradigms already discussed, the verb *biid* has a present stem /b′ə-/. When a vowel initial formative, such as first person singular /-ə∅°/, is added to this, the resulting form, here /b′ə-ə∅°/, is split up by an excrescent abstract consonant, /∅°/, yielding the surface form *biuu* /b′ə∅°ə∅°/. Similarly, when the second person singular absolute ending /-ə∅′/ is added to the stem /k′ə-/, the result is /k′ə∅′ə∅′/, with an excrescent consonant breaking up the illicit **VV structure. In this chapter, and elsewhere, I have assumed the colour of the excrescent consonant to mirror that of the following consonant, except where the orthography suggests otherwise.

The following table gives examples of the absolute third person singular.

[291] Stokes (1891: 60.25).

Table 81. Absolute 3rd person singular flexion of hiatus verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
raid	‘rows’	AIII	H1	XV-	Ra-
snaid	‘swims’	AIII	H1	XV-	sna-
gniid	‘does, makes’	AIII	H2	XV-	g′n′ə-
sceid	‘vomits’	AIII	H3	XV-	s′k′a-
sreid	‘scatters, casts’	AIII	H3	XV-	s′r′a-
bruid	‘smashes’	AIII	H3	XV-	b°r°ə-
foid	‘overnights’	AIII	H3	XV-	φ°a-
ciid	‘weeps’	AIII	H2	XV-	k′ə-
liid	‘imputes’	AIII	H2	XV-	L′ə-
biid	‘does be’	AIII	H2	XV-	b′ə-
luid	‘moves’	AIII	H3	XV-	L°ə-
		Absolute			
Ra-əθ′	→	Ra∅′əθ′	*ráid*		ZCP11[292]
sna-əθ′	→	sna∅′əθ′	*snaid*		Ml93c1
g′n′ə-əθ′	→	g′n′ə∅′əθ′	*gniid*		Sg199a5
s′k′a-əθ′	→	s′k′a∅′əθ′	*sceid*		Cor. Y323
s′r′a-əθ′	→	s′r′a∅′əθ′	*sreid*		LU3393
b°r°ə-əθ′	→	b°r°ə∅′əθ′	*bruid*		LU3632
φ°a-əθ′	→	φ°a∅′əθ′	*foid*		LU3878[293]
		Relative			
Ra-əs	→	Ra∅as	*raas*		ZCP3[294]
k′ə-əs	→	k′ə∅əs	*cías*		Fél Ep. 350
L′ə-əs	→	L′ə∅′əs	*liess*		AnÉ. 3385
g′n′ə-əs	→	g′n′ə∅′s	*gnís*		Ml29b8
b′ə-əs	→	b′ə∅′s	*bís*		Wb9d5
s′k′a-əs	→	s′k′a∅′as	*sceas*		LU832
L°ə-əs	→	L°ə∅′as	*lues*		Cor. Y1291
φ°a-əs	→	φ°a∅as	*foas*		Cor. Y795

The absolute non-relative forms here are relatively straightforward, showing the usual ending /-əθ′/. However, the relative is a great deal more problematic. For verbs with initial a-colour stems, the usual ending /-əs/ is used without controversy. For those with initial u-colour, this also seems to be the case, although *lues* (Cor. Y1291) seems to represent a form with medial i-colour, i.e. /L°ə∅′as/, with a stem modelled on the present. For verbs with initial i-colour, *cías* (Fél Ep. 350) and *liess* (AnÉ. 3385) also both show the regular formation.

[292] Thurneysen (1916: 86.18).
[293] Also found in Meyer (1912b: 310.25).
[294] Stokes (1901b: 223.11).

However, for the third person singular relative form of *biid* ‘does be’, there are ten instances of *bís* or *bis* and five of *bíis* or *biis* in the Würzburg glosses, while the corresponding figure for Milan is of forty-nine monosyllabic spellings and no disyllabic ones. The spelling *bíis* is itself problematic, as it seems to suggest an ending /-əs′/ rather than /-əs/, but the data appear to show a sound change in progress, with exceptional loss of hiatus in these forms already reasonably early in the Old Irish period. In the absence of any satisfactory synchronic explanation, it remains only to mark these forms as irregular. The following table examines third person singular conjunct forms.

Table 82. Conjunct 3rd person singular flexion of hiatus verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
ad·tá	‘is’	AIII	H1	XV-	·ta-
con·sná	‘sails	AIII	H1	XV-	·sna-
ad·cí	‘sees’	AIII	H2	XV-	·k′ə-
fris·accai	‘expects’	AIII	H2	XV-	·∅a^{G}-k′ə-
biid	‘does be’	AIII	H2	XV-	b′ə-
as·sré	‘sprinkles’	AIII	H3	XV-	s′r′a-
asa·gú	‘desires’	AIII	H3	XV-	g˚a-
as·luí	‘escapes’	AIII	H3	XV-	L˚ə-
con·oí	‘protects’	AIII	H3	XV-	·∅˚a-
ad·noí	‘entrusts’	AIII	H3	XV-	·N˚a-
imm·rá	‘navigates’	AIII	H1	XV-	·Ra-
do·gní	‘does, makes’	AIII	H2	XV-	g′n′ə-

Conjunct				
·ta-	→	·ta∅	*at·tá*	Wb4b11
·sna-	→	·sna∅	*con·sná*	IB §5
·k′ə-∅′	→	·k′ə∅′	*ad·cí*	Wb4a25
·∅a^{G}-k′ə-∅′	→	·∅ak′ə-	*ní·aicci*	Ml94c3
·∅akə-∅′	→	·∅akə-∅′	*fris·accai*	Ml114a2
·b′ə-∅′	→	·b′ə∅′	*ní·bí*	Sg68b3
·s′r′a-∅′	→	·s′r′a∅′	*a·sréi*	LB278a45
·g˚ə-	→	·g˚ə∅˚	*asa·gú*	Ml58b9
·L˚ə-∅′	→	·L˚ə∅′	*as·lui*	Thes.ii 21.36
·∅˚a-∅′	→	·∅˚a∅′	*con·ói*	Wb29d29
·N˚a-∅′	→	·N˚a∅′	*ad·noí*	Trip 1611

Imperfect				
·ra-əθ	→	·ra∅aθ	*imme·raad*	IB §61
·g′n′ə-əθ	→	·g′n′ə∅′əθ	*du·gníth*	Ml30a3
·L˚ə-əθ	→	·L˚ə∅aθ	*as·luad*	Ml54c21

In most cases, the conjunct third person singular can be analysed as endingless. However, there are a number of exceptions. One is the prototonic form of *ad·cí* ‘sees’, which varies between *·accai*, with an a-colour medial, and *·aicci*, with an i-colour one. The latter is unproblematic, but the former requires the i-colour ending /-∅′/, meaning that it might just be better to posit this for all hiatus verbs whose roots begin with i-colour, at least when the root is unstressed.

In general, verbs with initial u-colour also take the i-colour ending /-∅′/. The sole possible exception above is *asa·gú* (Ml58b9), from the somewhat strange verb *as·gú(si)* ‘chooses’ (Hamp 1986: 48f.), which usually has a following /-s′ə-/, even in the same corpus (cf *asa·gúsi*, Ml61b17, and *ad·gúsi*, Sg148a4), in these cases conjugating like a weak i-verb. The imperfect ending is regularly /-əθ/.

The extension of the i-colour pattern to verbs with initial u-colour can be seen by comparing *no·ḟoad* (LL286b44), with *no·foíed* (LU10607) and *no·foihed* (ED106.5). Forms such as *imm·cloeth* (Meyer 1907: 325.4), from *imm·cloí* ‘turns about, changes’ are somewhat ambiguous between the two formations. The imperfect of *do·gní* and *biid* shows the same irregularity here as in the absolute third person singular relative forms discussed above, with exceptional absence of hiatus. The following table sets out the first person plural present forms of vowels in hiatus.

Table 83. 1st person plural flexion of hiatus verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
biid	‘does be’	AIII	H2	XV-	b′ə-
liid	‘imputes’	AIII	H2	XV-	L′ə-
ad·tá	‘is’	AIII	H1	XV-	·ta-
ad·cí	‘sees’	AIII	H2	XV-	·k′ə-
do·gní	‘does, makes’	AIII	H2	XV-	g′n′ə-

Absolute				
b′ə-əm′ə∅′	→	b′ə∅′m′ə∅′	*bímmi*	Ml15a4
L′ə-əm′ə∅′	→	L′ə∅′m′ə∅′	*límmi*	Wb13b17
Relative				
b′ə-əm′a∅′	→	b′ə∅′ma∅′	*bimme*	Wb12c11
Conjunct				
·ta-əμ	→	·ta∅aμ	*at·taam*	Wb32a28
·k′ə-əμ	→	·k′ə∅aμ	*ad·ciam*	Wb6a30
·g′n′ə-əμ	→	·g′n′ə∅aμ	*do·gniam*	Wb15b9

The first person plural absolute ending is /-əm′ə∅′/, with relative /-əm′a∅′/. In these cases, after syncope a long vowel remains, likely on the model of the third person singular conjunct, where this is regular. The first person plural conjunct ending is the usual /-əμ/. The following table examines the forms of the second person singular.

Table 84. 2nd person plural flexion of hiatus verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
ad·tá	'is'	AIII	H1	XV-	·ta-
do·gní	'does, makes'	AIII	H2	XV-	·g′n′ə-
con·oí	'protects'	AIII	H3	XV-	·∅°a-
		Conjunct			
·ta-əθ′	→	·ta∅əθ′		*a·taaid*	Wb23c28
·g′n′ə-əθ′	→	·g′n′ə∅′əθ′		*do·gníith*	Wb9c15
·∅°a-əθ′	→	·∅°a∅′əθ′		*co-td·óith*[295]	Wb7d4

I have not uncovered any absolute examples here, nor any for the imperfect. The conjunct ending is the usual /-əθ′/, and all three instances in the Würzburg glosses for *do·gní* show the expected disyllabic forms, rather than the irregular monosyllabic ones of the third person singular imperfect, third person plural relative etc. The following table looks at the present absolute third person singular forms of hiatus verbs.

Table 85. Absolute 3rd person plural flexion of hiatus verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
raid	'rows'	AIII	H1	XV-	Ra-
biid	'does be'	AIII	H2	XV-	b′ə-
luid	'moves'	AIII	H3	XV-	L°ə-
foid	'overnights'	AIII	H3	XV-	φ°a-
gniid	'does, makes'	AIII	H2	XV-	g′n′ə-
		Absolute			
Ra-əd′	→	Ra∅′əd′		*rait*	Otia 1[296]
b′ə-əd′	→	b′ə∅′əd′		*biit*	Wb29a28
L°ə-əd′	→	L°ə∅°əd′		*luait*	TBC5484
φ°a-əd′	→	φ°a∅°əd′		*fooit*	Rwl122by
		Relative			
g′n′ə-əd′a∅′	→	g′n′ə∅′d′a∅′		*gníte*	Sg156b6
b′ə-əd′a∅′	→	b′ə∅′d′a∅′		*bíte*	Wb9a11

[295] With neuter 3rd person singular infix pronoun /-d^{L}/.
[296] Meyer (1899: 125.16).

The absolute third person plural for these verbs is marked by the regular ending /-əd′/. The reanalysed /X°ə∅′-/ stems of the verbs with initial u-colour can be seen from later forms such as *cloiet*, from *cloid* 'turns back' (Meyer 1912c: 122 §11). For the absolute relative, the ending is /-əd′a∅′/. For *gniid* and *biid* there is again a long vowel in the surface forms after the syncopation of the second syllable, as in the third person singular imperfect. Unfortunately, I am not aware of any examples for other verbs.

Table 86. Conjunct 3rd person singular flexion of hiatus verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
ad·tá	'is'	AIII	H1	XV-	·ta-
do·gní	'does, makes'	AIII	H2	XV-	g′n′ə-
ad·cí	'sees'	AIII	H2	XV-	·k′ə-
sceid	'vomits'	AIII	H3	XV-	s′k′a-
as·luí	'escapes'	AIII	H3	XV-	L°ə-
do·soí	'turns'	AIII	H3	XV-	s°a-
baid	'dies'	AIII	H1	XV-	ba-
luid	'moves'	AIII	H3	XV-	L°ə-
con·toí	'turns, converts'	AIII	H3	XV-	·∅°a-

Conjunct				
·ta-əd	→	·ta∅ad	*a·taat*	Sg71b9
·g′n′ə-əd	→	·g′n′ə∅′ad	*do·gniat*	Ml139a8
·k′ə-əd	→	·k′ə∅′ad	*ad·ciat*	Ml69b2
·s′k′a-əd	→	·s′k′a∅′ad	*co·sceet*[297]	YBL85b11
·L°ə-əd	→	·L°ə∅ad	*as·luat*	Ml44a17
·s°a-əd	→	·s°a∅°ad	*do·soat*	Sg209b8
Imperfect				
·ba-əd′əs′	→	·ba∅dəs′	*no·mbatais*[298]	Ml40a2
·g′n′ə-əd′əs′	→	·g′n′ə∅′d′əs′	*dond·gnítis*	Sg9a21
·k′ə-əd′əs′	→	·k′ə∅′d′əs′	*at·citis*	MT 147.14
·L°ə-əd′əs′	→	·L°ə∅°d′əs′	*luitis*	ZCP11[299]
·t°a-əd′əs′	→	·t°a∅°d′əs′	*con·tóitis*	LU10127

The conjunct third person plural is quite well attested, for all root shapes, and the ending is, as usual, /-əd/. Alongside the frequent examples of verbs with initial i-colour, there are also numerous further early examples for forms with initial u-colour, such as *as·tuat* (ED 120.7) from *as·toí* 'kindles', *cot·noat* (Ml112b20), from *con·oí* 'protects', and *con·toat* (Ml46c1), from *con·toí* 'turns, converts'. The adoption of the reanalysed

[297] With particle /k°a-/, nasalising.
[298] With particle /N°ə-/, nasalised as relative.
[299] Meyer (1916: 152.12).

stem /X˚ə∅′-/ for such verbs can be seen in examples such as *con·toiet* (Meyer 1912c: 122 §11), also from *con·toí*, and may also be apparent in *co·mbruet* (SR8123), from *bruid* ‘smashes’.

For the imperfect, the usual ending /-əd′əs′/ is found here, although *·batais* has an a-colour /-d-/, also found sporadically elsewhere. Examples such as *luitis* are ambiguous, but here I have taken it to represent the a form built on the XV- root /L˚ə-/, rather than /L˚ə∅′-/ remodelled on the third person singular conjunct. It is difficult to determine the length of the vowel in these instances. It is marked long in *dond·gnítis* (Sg9a21) and in *con·tóitis*, where it could equally well represent a form built on the root /t˚a-/ or one built on the root /t˚a∅′-/, pari passu for *con·nóitis* (Met. Dind. iv 210.20), from *con·oí* ‘protects’. The mark of length is absent from the other examples, but I have tentatively assumed a long vowel as the result of these instances, on the model of the cases in which the mark of length is present.

This concludes the discussion of the present tense of hiatus verbs in Old Irish, and indeed the discussion of verbs with active flexion more generally. The following section looks at verbs which take deponent flexion in the present, as well as examining the present passive flexion in Old Irish.

5.2. Deponent and passive flexion of the present

This section examines present deponent and passive flexion in Old Irish. The two must be carefully disambiguated. In general, all Old Irish verbs can take passive inflexion. Further to that, most verbs take either active flexion or deponent flexion, although there are some verbs which are sometimes inflected according to the active paradigm and sometimes according to the deponent paradigm. As mentioned in 4.3.1, Le Mair (2011: 63f.) argues that verbs taking the deponent flexion typically have the semantics of the middle voice. The deponent flexion is discussed in 5.2.1, below, while the passive flexion is examined in 5.2.2.

5.2.1. Deponent flexion

This subsection examines the deponent flexion. While the deponent flexion is found with both weak and strong verbs (alongside a very small number of hiatus verbs) it is particularly common with weak verbs (5.1.1). Of the 365 verbs in LeMair's (2011: 45) corpus from the Würzburg and Milan glosses, 203 take deponent flexion. Of these, 187 are *-igidir* verbs (see subsection 4.3.1, above), belonging to the i-colour pattern of weak verb inflexion.

A small number of strong verbs also take deponent flexion in the present, although it is considerably less frequent than with weak verbs. I am not aware of any cases which belong to the alternating pattern of strong verbs, whose active flexion has been discussed in 5.1.2.1, although it should be noted that the deponent verbs *ad·tluichethar* 'gives thanks' and *do·tluichethar* 'craves', although otherwise declining as weak verbs, illustrate this pattern of stem final alternation. The verb *ad·gládathar* 'addresses' is associated to the a-colour pattern of verbs with XVX- roots examined in 5.1.2.2, while others are associated to the i-colour pattern covered in subsection 5.1.2.3, e.g. *gainithir* 'is born', *midithir* 'judges', *ro·laimethar* 'dares', and compounds based on *·moinethar*, especially *do·moinethar* 'supposes'. Although usually classed with the nasal presents with XV- roots, I have instead classified *ro·finnadar* 'gets to know' as a nasal present with a XVX- root ending in an obstruent, thus grouped with the class of nasal presents discussed in 5.1.3.1. The common verb *ro·cluinethar* 'hears' is indeed a nasal present with an XV- root, of the type whose active flexion has been explored in subsection 5.1.3.3. The only hiatus verbs of which I am aware which take deponent flexion are compounds based on the root /L°ə-/, e.g. *fo·luathar* 'flies' and *for·luathar* 'flutters'.

Although deponent verbs are well attested, there are nevertheless several gaps in the paradigm. Thurneysen (*GOI*: §569) points out that absolute forms with deponent flexion are somewhat uncommon, the active typically being used instead. He is able to identify only one non-relative form with an a-colour root-final consonant which takes deponent flexion. Furthermore, I have been unable to find any absolute first person singular examples from weak verbs, although they do occur with deponent strong verbs. The following paragraphs, divided by person and number, give examples for deponent verbs, beginning with the first person singular.

Table 87. Deponent 1st person singular flexion of weak verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
midithir	'judges'	BII	S2	XVX-	m′əð′-
do·moinethar	'supposes'	BII	S2	XVX-	·m˚an′-
samlaithir	'likens to'	AI	W1	XVXVX-	saμal-
ad·amraigethar	'marvels'	AII	W2a	XVXVXV-ig-	aðaμrə-əɣ′-
ad·muilnethar	'repeats'	AII	W2a	XVXVX-	·m˚əl′ən-[300]
molaithir	'praises'	AI	W1	XVX-	m˚al-
ad·tluichethar	'gives thanks'	AII	W2a	XVX-	·t˚l˚əx-
ro·cluinethar	'hears'	BV	S3	XVX-	k˚l˚ə-n′- → ·k˚l˚ən′-
fo·luathar	'flies'	AIII	H3	XV-	·L˚ə-
con·airlethar	'consults	AII	W2a	XVXV-	·∅ər′l′ə-

Absolute				
m′əð′-ər˚	→	m′əð′-ər˚	*midiur*	Wb9a2
Conjunct				
·m˚an′-ər˚	→	·m˚an′ər˚	*do·moiniur*	Wb14a10
·saμal-ər˚	→	·saμlər˚	*na·samlur*[301]	Wb3c6
·ˈ∅aðaμrə-ˌəɣ′-ər˚	→	·ˈ∅aðaμrˌəɣ˚ər˚	*no·adamrugur*[302]	Wb16c3
·m˚əl′ən-ər˚	→	·m˚əl′n′ər˚	*ad·muilniur*	Wb18c12
·m˚al-ar˚	→	·m˚al˚ar˚	*nondob·molor*[303]	Wb14c18
·t˚l˚əx-ər˚	→	·t˚l˚əx˚ər˚	*a·tluchur*	Wb3b19
·k˚l˚ən′-ər˚	→	k˚l˚ən′ər˚	*ro·cluiniur*	LU6899
·L˚ə-ər˚	→	·L˚ə∅˚ər˚	*fo·luur*	Sg146b11
Imperfect				
·∅ər′l′ə-əN′	→	·∅ər′l′əN′	*con·airlin*	Ml54c27

Although I am not aware of any examples of the absolute for weak deponent verbs, the evidence from primary verbs shows that the ending was /-ər˚/. The same ending is found regularly in the conjunct, although the form ·*molor*, suggests rather the ending /-ar˚/. This variation is exactly parallel to that found in the a-colour pattern of strong verbs, discussed in 5.1.2.2, above. Of the other forms shown above, it should be noted that *a·tluchur* appears to have a u-colour stem-final consonant, as is found in strong verbs which take the alternating pattern in the present (5.1.2.1). For the imperfect, where there is no difference between the active and deponent flexion, the ending is, as per usual, /-əN′/. The following table examines second person singular deponent forms.

[300] The representation here is based on Le Mair (2011: 159f.), who considers this verb to be based on *muilenn* 'mill'.
[301] With particle /N˚ə-/ and 2nd person plural infix pronoun /-d˚əβ/.
[302] Here treated as a simple verb *adamraigidir*, while elsewhere it generally behaves as rather *ad·amraigethar*.
[303] With particle /N˚ə-/ and neuter 3rd person singular infix pronoun /-a^{L}/.

Table 88. Deponent 2nd person singular flexion of weak verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
folnaithir	‘rules, reigns’	AI	W1	XVX-	φ˚alən-
adbartaigther	‘opposes’	AII	W2a	XVXVX-ig-	∅aðβart-əɣ′-
do·meicethar	‘despises’	AII	W2a	XVXVX-	·m′ag′ə-[304]
midithir	‘judges’	BII	S2	XVX-	m′əð′-

Absolute				
φ˚alən-əθ′ər	→	φ˚aLəθ′ar	*follaither*	Ml82d5
ˈ∅aðβart-ˌəɣ′-əθ′ər	→	ˈ∅aðβarˌtəɣ′θ′ar	*adbartaigther*	Ml44b31

Conjunct				
·φ˚alən-əθ′ər	→	·φ˚alnəθ′ar	*·falnather*	Rwl152b12
·m′ag′ə-əθ′er	→	·m′ak′əθ′ar	*do·meiccither*	Wb1d13
·m′əð′-əθ′ər	→	·m′ət′ər	*for-sa·mitter*	Wb6b22

The vocalism of the deponent second person singular forms suggests the disyllabic ending /-əθər′/ for both absolute and conjunct. The errant form *díxnigedar* ‘exists’ (Wb4c24) is annotated as relative second person singular in all the sources known to me (Thes. ii, 521; Kavanagh 2003: 312 etc.). However, formally, this is clearly third person singular.[305] Further third person singular forms are shown in the table below.

Table 89. Deponent 3rd person singular flexion of weak verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
beoigidir	‘vivifies’	AII	W2a	XVX-ig-	b′a∅˚-əɣ′-
midithir	‘judges’	BII	S2	XVX-	m′əð′-
luid	‘moves’	AIII	H3	XV-	L˚ə-
labraithir	‘speaks’	AI	W1	XVXVX-	Laβar-
gainithir	‘is born’	BII	S2	XVX-	gan′
comalnaithir	‘fulfils’	AI	W1	XVXVX-	k˚aµla∅n-
do·tluichethar	‘craves’	AII	W2a	XVX-	·t˚l˚əx-
ro·cluinethar	‘hears’	BV	S3	XVX-	k˚l˚ə-n′- → ·k˚l˚ən′-
for·luathar	‘flutters’	AIII	H3	XV-	L˚ə-

Absolute				
ˈb′a∅˚-ˌəɣ′-əθ′r′	→	ˈb′a∅˚ˌəɣ′əθ′ər′	*beoigidir*	Wb13d7

[304] Later examples point clearly to /-g′-/, not /-k′/, in the spelling of this verb, in spite of the spelling of the example below. Its behaviour points to a disyllabic root (Cowgill 1983: 88).

[305] The full gloss is *cia tussu díxnigedar?*, glossing the Latin *tu quis és?* ‘who are you?’. However, the Irish here requires a relative, thus literally the text would read ‘who (are) you (that) is’. The verb *díxnigidir* is said by Kavanagh (2001: 312) to mean ‘exists, is’, and Thurneysen remarks that it is often used by the glossators to render the present forms of Latin *esse* ‘when severed from context, or in attempts to reproduce non-Irish constructions’. Interesting here is his example of the gloss *cia hé nu·ndixnaigther?* (Ml75c9), literally ‘who (is) he that you are?’ with a third person pronoun and a second person verb, in contrast to the first example (with *díxnigedar*), which is effectively the reverse, with a second person pronoun coupled with a third person verb.

m′əð′-əθ′r′	→	m′əð′əθ′ər′	*midithir*	Ml30c8
L°ə-əθ′r′	→	L°ə∅′əθ′ər′	*lúithir*	ZCP11[306]
		Relative		
Laβar-əθr	→	Laβraθar	*labrathar*	Ml35d22
gan′-əθr	→	gan′aθar	*gainethar*	Ml44a11
		Conjunct		
·k°aμla∅n-əθr	→	·k°aμalnaθar	*nád·chomalnathar*	Wb27c14
·t°l°əx′-əθr	→	·t°l°əx′aθar	*do·tluichethar*	Ml36a28
·m′əð′-əθr	→	m′əð′əθər	*ní·midedar*	Sg63a14
·k°l°ən′-əθr	→	·k°l°ən′-əθr	*ro·cluinethar*	Wb12c22
·L°ə-əθr	→	·L°ə∅aθar	*for·luathar*	Ériu 2[307]
		Imperfect		
·k°aμla∅n-əθ	→	·k°aμalnəθ	*no·chomallad*	Ml36a21
·k°l°ən′-əθ	→	·k°l°ən′-əθ	*ro·chluined*	LL260a27

The absolute third person singular ending is regularly /-əθ′r′/, while the relative and the conjunct both have the ending /-əθr/. Positing these forms, with a final consonant cluster which is broken up on the surface by an intrusive vowel, neatly accounts for the fact that the penultimate surface vowel is never syncopated. Arguments in favour of this analysis have already been put forward in 4.3.1 and 4.3.3.3 The imperfect third person singular ending is the usual /-əθ/. The following table shows first person plural forms.

Table 90. Deponent 1st person plural flexion of weak verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
dechraigidir	'is scattered'	AII	W2a	XVXVX-ig-	d′ax°ər-əɣ′-
cosmuiligidir	'compares'	AII	W2a	XVXVX-ig-	k°asm°əl′-əɣ′-
fris·áilethar	'looks forward'	AII	W2a	XVX-	·∅a∅l′-
ad·tluichethar	'gives thanks'	AII	W2a	XVX-	·t°l°əx-
ro·laimethar	'dares'	BII	S2	XVX-	·Laμ′
ro·cluinethar	'hears'	BV	S3	XVX-	k°l°ə-n′- → ·k°l°ən′-
		Absolute			
ˈd′ax°ər-ˌəɣ′-əm′ər′	→	ˈd′ax°ˌr°əɣ′m′ər′		*dechrigmir*	Ml117b9
		Relative			
ˈk°asm°əl′-ˌəɣ′-əmər	→	ˈk°asm°əˌl′əɣ′m′ar		*cosmiligmmer*	Sg211a14
		Conjunct			
·∅a∅l′-əmr	→	·∅a∅l′əmar		*fris·ailemmar*	Ml63c7
t°l°əx-əmr	→	·t°l°axamar		*ad·tlochomar*	Ériu 3[308]
·Laμ′-əmr	→	·Laμ′amar		*ro·laimemmar*	Wb15c19
·k°l°ən′-əmr	→	·k°l°ən′amar		*ro·chluinemmar*	Ml112b13

[306] Thurneysen (1916: 97.10).
[307] Stokes (1905b: 120 §58).
[308] Strachan (1907: 2.1).

At first blush, one would expect monosyllabic endings here, given the fact that the /-m-/ and the /-r/ always share the same consonant colour: i-colour for the absolute and a-colour for the relative and conjunct. The evidence from the strong deponents, e.g. *ro·chluinemmar* (Ml112b13) from *ro·cluinethar* 'hears', supports this and indeed for the non *-igidir* verbs, the endings /-əmʹrʹ/ for the absolute and /-əmr/ for the relative and conjunct account for the attested surface forms. However, to account for the aberrant behaviour of the *-igidir* verbs, in which /-əɣʹ/ is never followed by a vowel on the surface in present tense forms, it seems necessary to instead posit the disyllabic endings /-əmʹərʹ/ for the absolute and /-əmər/ for the relative and the conjunct. It is possible that *laimir* (Wb15c20 a prima manu) reflects the absolute form of *ro·laimethar*, without any preverb. The second person plural forms are shown in the table below.

Table 91. Deponent 2nd person plural flexion of weak verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
acarbaigidir	'roughens'	AII	W2a	XVXVX-ig-	∅agarβ-əɣʹ-
in·samlaithir	'imitates	AI	W2a	XVXVX-	saμal-
ro·laimethar	'dares'	BII	S2	XVX-	·Laμʹ
			Absolute		
ˈ∅agarβ-ˌəɣʹ-əθʹa∅ʹ	→	ˈ∅agarβˌəɣʹtʹa∅ʹ		*acarbaigte*	Ml87b14
			Conjunct		
·saμal-əθʹ	→	saμləθʹ		*int·samlid*	Wb14a28
·Laμʹ-əθʹ	→	·Laμʹəθʹ		*ro·laimid*	MDiii 286.2

The second person plural deponent endings are exactly the same as the corresponding endings of the active, i.e. /-əθʹa∅ʹ/ for the absolute and /-əθʹ/ for the conjunct. The following table shows the present deponent flexion of the third person plural.

Table 92. Deponent 3rd person plural flexion of weak verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
suidigidir	'places'	AII	W2a	XVXV-ig-	s˚əðʹə-əɣʹ-
bindigidir	'makes melodious'	AI	W2a	XVX-ig-	bʹənʹdʹ-əɣʹ-
comalnaithir	'fulfils'	AI	W1	XVXVX-	k˚aμla∅n-
ro·laimethar	'dares'	BII	S2	XVX-	·Laμʹ-
fris·labrathar	'speaks against'	AI	W1	XVXVX-	Laβar-
ro·cluinethar	'hears'	BV	S3	XVX-	k˚lʹ˚ə-nʹ-→ ·k˚lʹ˚ənʹ-
fáiltigidir	'rejoices'	AII	W2a	XVXVX-ig-	φa∅lʹtʹə-əɣʹ-
			Absolute		
ˈs˚əðʹə-ˌəɣʹ-ədʹrʹ	→	ˈs˚əðʹˌəɣʹədʹərʹ		*suidigitir*	Wb13d7

		Relative		
ˈbʹənʹdʹ-ˌəɣʹ-ədʹrʹ	→	ˈbʹənʹdʹˌəɣʹədʹərʹ	*bindiggedar*	Sg10a9
		Conjunct		
·k˚aμlaØn-ədr	→	·k˚aμaLadar	*na·comallatar*	Wb27c14
·Laμʹ-ədr	→	·Laμadar	*ro·lamatar*	Thes.ii236
·Laβar-ədr	→	·Laβaradar	*fris·labratar*	Ml55a10
·k˚lʹ˚ənʹ-ədr	→	·k˚lʹ˚ənʹadar	*ro·chlúinetar*	Wb11b6
		Imperfect		
·Laβar-ədʹəsʹ	→	·Laβarədʹəsʹ	*fris·labritis*	Ml58d12
·ˈφaØlʹtʹə-ˌəɣʹ-ədʹəsʹ	→	·ˈφaØlʹˌtʹəɣʹdʹəsʹ	*nu·failtigtis*	Ml61a2

The third person plural absolute, relative, and conjunct endings are monosyllabic, as in the third person singular, this accounting for the fact that the penultimate vowel is not syncopated. The absolute ending is /-ədʹrʹ/, while the relative and conjunct endings are both /-ədr/. As usual, the imperfect ending is /-ədʹəsʹ/.

This concludes the discussion of the deponent flexion in the present. The following section examines rather passive flexion.

5.2.2. Passive flexion

The Old Irish passive does not show a full declension for person and number, but rather has only a distinct third person plural form and a so-called *general* form. First and second person passives are formed by means of using an infix pronoun with the general form. In the absolute, the customary third person distinction between non-relative and relative applies and there is also the usual distinction between absolute and conjunct.

This leaves eight principal forms to be discussed with reference to the present stem: absolute general and third person plural, absolute relative general and third person plural, conjunct general and third person plural, and imperfect general and third person plural. As in the deponent, the conjunct forms are isomorphic to the corresponding absolute relative forms. This has led me to organise the material in the following subsections by discussing first the general forms, then the third person plural forms, then the imperfect forms.

Special present passive endings are associated to the general forms of strong verbs. I have therefore kept apart the weak and hiatus verbs, discussed first in subsection 5.2.2.1, apart from the strong and hiatus verbs in 5.2.2.2.

5.2.2.1. Present passive flexion of weak and hiatus verbs

The following paragraphs lay out the flexion of the present passive of weak and hiatus verbs. The general flexion is discussed first, then the flexion of the third person plural, and finally the flexion of the imperfect. For the general and third person plural flexion, absolute, absolute relative, and conjunct forms can be distinguished, the absolute relative and conjunct forms being isomorphic. The imperfect, being conjunct by nature, distinguishes only the general from the third person plural and has no distinct relative. I have attempted to provide a balance of examples of weak i-verbs, weak a-verbs, deponents and hiatus verbs in what follows. The table below shows the present passive general flexion of weak and hiatus verbs

Table 93. Present passive present general flexion of weak and hiatus verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
línaid	'fills'	AI	W1	XVX-	L′ə∅′n-
comalnaithir	'fulfils	AI	W1	XVXVX-	k˚aμla∅n-
foídid	'sends'	AII	W2a	XVX-	φ˚a∅′ð′-
foilsigidir	'shows'	AII	W2a	XVXV-ig	φ˚al′s′ə-əɣ′-
suidigidir	'places'	AII	W2a	XVXV-ig	s˚əð′ə-əɣ′-
biid	'does be'	AIII	H2	XV-	b′ə-
for·cenna	'puts an end to'	AI	W1	XVX-	·k′əN-
fo·cíallathar	'heeds'	AI	W1	XVX-	·k′a∅L-
as·foídi	'sends forth'	AII	W2a	XVX-	·φ˚a∅′ð′-
cumgaigidir	'constricts'	AII	W2a	XVXVX-ig-	k˚aμ˚əng-əɣ′-
do·gní	'does, makes'	AIII	H2	XV-	g′n′ə-
ad·cí	'sees'	AIII	H2	XV-	k′ə-
		Absolute			
L′ə∅′n-əθ′ər′	→	L′ə∅′ntər′		*líntair*	Ml25a9
k˚aμla∅n-əθ′ər′	→	k˚aμalnəθ′ər′		*comalnithir*	Ml128d11
φ˚a∅′ð′-əθ′ər′	→	φ˚a∅′t′ər′		*foítir*	Wb45a8
φ˚al′s′-əɣ′-əθ′ər′	→	ˈφ˚al′ˌs′əɣ′θ′ər′		*foillsigthir*	Ml25c5
ˈs˚əð′ə-ˌəɣ′-əθ′ər′	→	ˈs˚əˌð′əɣ′θ′ər′		*suidigthir*	Ml120d9
b′ə-əθ′ər′	→	b′ə∅′θ′ər′		*bithir*	Ml56b15
		Relative			

L′ə∅′n-əθ′ər	→	L′ə∅′ntər	*líntar*	Wb11b13
φ˚a∅′ð′-əθ′ər	→	φ˚a∅′t′ər	*foiter*	Wb17a11
ˈφ˚alʹs′-ˌəɣ′-əθ′ər	→	ˈφ˚alʹˌs′əɣ′θ′ər	*foilsigther*	Sg211a10
ˈs˚əð′ə-ˌəɣ′-əθ′ər	→	ˈs˚əˌð′əɣ′θ′ər	*suidigther*	Ml87d15
		Conjunct		
·k′əN-əθ′ər	→	·k′əNtər	*for·centar*	Ml26b10
·k′a∅L-əθ′ər	→	·k′a∅Ltər	*fo·cialtar*	Wb29c4
·φ˚a∅′ð′-əθ′ər	→	·φ˚a∅′t′ər	*asa·foiter*	Ml48c8
·ˈk˚aμ˚əng-ˌəɣ′-əθ′ər	→	·ˈk˚aμ˚ˌg˚əɣ′θ′ər	*ni·cumgaigther*	Ml32d14
·k′ə-əθ′ər	→	·k′ə∅′θ′ər′	*ad·cither*	Wb1b15
·g′n′ə∅′-əθ′ər	→	·g′n′ə∅′θ′ar	*do·gníther*	Wb10c11

The absolute ending of the general form is /-əθ′ər′/, while I have taken the ending for the absolute relative and for the conjunct to be /-əθ′ər/, on the basis of the i-colour dental consistently found in the hiatus forms. These latter are somewhat difficult to evaluate, however, because of the orthographic differences in the available corpora.

For example, for *do·gní* ‘does, makes’ and *fo·gní* ‘serves’, there are nine passive forms with a vowel marked for length in the Würzburg glosses and four with no length marking. In the St. Gallen glosses, the corresponding figures are five and one. For *biid*, there are seven cases of a vowel marked long before a consonant initial ending in Würzburg and four without such marking, while St. Gallen shows twelve vowels marked long and none short.

However, the Milan glosses show the opposite tendency (ten vowels unmarked for length and one marked long for the passive forms of *do·gní*; sixteen forms of *biid* before a consonant initial ending, all with the mark of length). Some of this may have to do with the inconsistent marking of length in the Milan glosses, but the fact is that the passive forms of *ciid* ‘weeps’ *ad·cí* ‘sees’ in these corpora are never marked for vowel length either, suggesting the situation may be more complex than this. In particular in the case of *ad·cí* forms such as *ad·cither*, above, are compatible with a present stem retaining historical /h/, i.e. /k′əh-/. More broadly, there is general inconsistency in terms of the results of the syncope of vowels in hiatus, with sometimes short and sometimes long vowels being found. In view of this, I have tentatively written the stressed vowels of the passives of hiatus verbs as though they were long throughout this subsection. A more detailed study of this question is, however, a desideratum.

The following table looks at the present passive third person plural flexion of weak and hiatus verbs.

Table 94. Present passive 3rd person plural flexion of weak and hiatus verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
línaid	‘fills’	AI	W1	XVX-	L′ə∅′n-
suidigidir	‘places’	AII	W2a	XVXV-ig	s°əð′ə-əɣ′-
gniid	‘does, makes’	AIII	H2	XV-	g′n′ə-
cruthaigidir	‘creates’	AII	W2a	XVX-ig-	k°r°əθ°-əɣ′-
íccaid	‘pays, atones for’	AI	W1	XVX-	∅′ə∅′k-
for·cenna	‘puts an end to’	AI	W1	XVX-	·k′əN-
imm·lúaidi	‘sets in motion’	AII	W2a	XVX-	·L°a∅ð′-
do·gní	‘does, makes’	AIII	H2	XV-	·g′n′ə-
ad·cí	‘sees’	AIII	H2	XV-	·k′ə-

Absolute				
L′ə∅′n-əd′ər′	→	L′ə∅′ndər′	*líntair*	Ml25a9
ˈs°əð′ə-ˌəɣ′-əd′ər′	→	ˈs°əˌð′əɣ′d′ər	*suidigtir*	Ml120d9
g′n′ə-əd′ər′	→	g′n′ə∅′d′ər′	*gnitir*	Ml38a5

Relative				
s°a∅′r-əd′ər	→	s°a∅′rdər	*soirtar*	Ml75a4
ˈk°rəθ°-ˌəɣ′-əd′ər	→	ˈk°r°əˌθəɣ′d′ər	*cruthaigter*	Ml138c1
∅′ə∅′k-ədr	→	∅′ə∅′kəder	*híccatar*	Wb4a8
g′n′ə-əd′ər	→	g′n′ə∅′d′ər	*gniter*	Ml21c3

Conjunct				
·L°a∅ð′-əd′ər	→	·L°a∅d′ar	*imme·luaiter*	Ml135b9
·R′ə∅′m′-əd′ər	→	·R′ə∅′m′d′ar	*ad·rimter*	Ml99d9
·R′ə∅′m′-ədr	→	·R′ə∅′m′adar	*ad·rimetar*	Ml111a10
·k′əN-ədr	→	·k′aNadar	*for·cennatar*	Ml48a15
·k′ə-əd′ər	→	·k′ə∅′d′ar	*ad·chiter*[309]	Ériu 2[310]
·g′n′ə∅′-əd′ər	→	·g′n′əd′ar	*do·gníter*	Sg35b13

For the passive third person plural, then ending is typically /-əd′ər′/ for the absolute and /-əd′ər/ for the relative and conjunct, the i-colour dental in the latter form being justified on the basis of the forms of verbs in hiatus. Occasionally, and presumably through confusion with the deponent, the endings /-əd′r′/ and /-ədr/, respectively, must instead be posited. This variation does not appear to be conditioned in any way and can be seen even in one and the same text and for the same verb, as the examples show.

For the absolute, there are also several cases in the glosses in which unexpected endings are found, e.g. *suidigter* (Ml65c16), rather than *suidigtir* (Ml120d9), and *scríbatar* (Wb17b12) and *sásatar* (Ml40a10) which look like relative forms but do not

[309] The initial of the stem is lenited here as it is relative.
[310] Stokes (1905b: 106 §19).

appear in contexts in which the relative would be expected. The following table examines the imperfect passive of weak and hiatus verbs.

Table 95. Imperfect passive flexion of weak and hiatus verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
línaid	'fills'	AI	W1	XVX-	L′ə∅′n-
creitid	'believes	AII	W2a	XVX-	k′r′ad′-
imm·timchella	'surrounds'	AI	W1	XVXVXVX-	·təm′əx′əL-[311]
do·gní	'does, makes'	AIII	H2	XV-	g′n′ə-
do·ella	'deviates'	AIII	H2	XV-	k′ə-

General				
·L′ə∅′n-əθ′a∅′	→	·L′ə∅′nta∅′	*nu·lintae*	Ml32b15
·L°as′k′-əθ′a∅′	→	·L:°as′k′θ′a∅′	*nu·lloiscthe*	Ml32c13
·təm′əx′əL-əθ′a∅′	→	·təm′x′əLta∅′	*im·thimcheltae*	Ml65c3
·g′nə-əθ′a∅′	→	·g′n′ə∅′θa∅′	*do·gníthe*	Wb15a18
3rd person plural				
·∅′aL-əd′əs′	→	·∅′aLdəs′	*du·elltis*	Sg4d4

The passive imperfect endings are /-əθ′a∅′/ for the general form and /-əd′əs′/ for the plural form. These forms are not particularly frequent and I am not aware of any variation.

This concludes the discussion of the present passive forms of weak and hiatus verbs. The next subsection examines rather the present passive of strong verbs.

5.2.2.2. Present passive flexion of strong verbs

For the general forms, the passive of strong verbs is characterised by a different set of endings to the passive of weak and hiatus verbs. For the third person plural forms and the imperfect the endings are, however, the same. As for the passive of weak verbs, discussed in 5.2.2.1.1, above, I have organised the material for the strong verbs beginning with the general forms, then discussing the third person plural forms, and finally those of the imperfect. In each case, I have attempted to provide a range of examples from the different strong patterns explored in section 5.1.2, above. The following table lays out the present passive general flexion of strong verbs.

[311] This verb clearly behaves as one based on a trisyllabic root.

Table 96. Present passive general flexion of strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
dligid	‘is entitled to, owed’	BI	S1a	XVX-	d′l′əɣ-
beirid	‘carries’	BI	S1a	XVX-	k′r′ad′-
téit	‘goes’	BI	S1a	XVX-	b′ar-
canaid	‘sings’	BI	S1c	XVX-	kan-
benaid	‘strikes’	BIV	S3	XVX-	b′ə-n- → b′an-
gabaid	‘takes’	BII	S2	XVX-	gaβ′-
do·eim	‘covers, shelters’	BI	S1a	XVX-	·∅′aμ-
ad·fét	‘tells, relates’	BI	S1b	XVX-	·φ′a∅ð-
do·fuissim	‘pours out’	BI	S1a	XVX-	φ˚əs′əμ-
for·cain	‘teaches’	BI	S1c	XVX-	·kan-
as·beir	‘says’	BI	S1a	XVX-	·b′ar-

Absolute

d′l′əɣ-r′	→	d′l′aɣər′	*dlegair*	Ml55a7
b′ar-r′	→	b′arər′	*berair*	Ml80c7
kan-r′	→	kanər′	*canair*	Fél Sep 11
b′an-r′	→	b′anər′	*benir*	Wb4d15
gaβ′-θ′ər′	→	gaβ′θ′ər′	*gaibthir*	Wb16d7

Relative

b′ar-ər	→	b′arar	*berar*	Wb16d7
t′a∅ɣ-r	→	t′a∅ɣar	*tiagar*	Ml15a2

Conjunct

·φ′a∅ð-r	→	·φ′a∅ðar	*ad·fiadar*	Wb18c8
·∅′aμ-r	→	·∅′aμar	*du·emar*	Ml87d5
φ˚əs′əμ-r	→	·φ˚əs′aμar	*do·fuissemar*	Ml121b6
·kan-r	→	·kanar	*for·canar*	Ml50d12
·b′ar-ər	→	·b′arar	*as·berar*	Wb9d5
·b′ar-r	→	·b′aRas·	*as·berr*	Wb21c7

For strong verbs, the absolute ending of the passive is usually /-r′/, while the relative and conjunct endings have the ending /-r/. These endings neatly explain the lack of syncope in conjunct forms, e.g. *do·fuissemar* rather than ***do·fuissmer*. Further support comes from the occurrence of the form *as·berr* which is general in the Milan glosses and occurs beside *as·berar* in the Würzburg glosses. The latter form, as well as the disyllabic absolute forms of the simple verb *beirid* shown above, would thus be seen as analogical, and necissitate a separate ending /-ər/. Further support for this analysis may come from the stray form *ad·nur* (Gwynn 2015: 207§19) from the hiatus verb *ad·noí* ‘entrusts’, although the example is uncertain.

Hiatus verbs, in spite of the example just given, nearly always take the same passive endings as the weak verbs, and this is occasionally found also with strong verbs which take the i-colour pattern in the present, as the example *gaibthir* (Wb16d7), above, shows. The following table examines the third person plural forms.

Table 97. Present passive 3rd person plural flexion of strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
beirid	'carries'	BI	S1a	XVX-	kʹrʹadʹ-
midithir	'judges'	BII	S2	XVX-	mʹəðʹ-
ad·fét	'tells, relates'	BI	S1b	XVX-	·φʹa∅ð-
for·cain	'teaches'	BI	S1c	XVX-	·kan-
as·beir	'says'	BI	S1a	XVX-	·bʹar-
		Absolute			
bʹar-ədʹərʹ	→	bʹardərʹ	*bertair*		Ml26c6
mʹəðʹ-ədʹrʹ	→	mʹəðʹədʹərʹ	*miditir*		Wb4c9
		Relative			
bʹar-ədʹər	→	bʹardər	*bertar*		Wb25c23
		Conjunct			
·φʹa∅ð-ədr	→	·φʹa∅ðadar	*ad·fiadatar*		Ml23a13
kan-ədʹər	→	·kandar	*for·cantar*		Ml34b12
·bʹar-ədʹər	→	·bʹardar	*as·bertar*		Wb28a20

The third person plural passive endings are the same for strong and hiatus verbs as for weak verbs. In the absolute, the ending is usually /-ədʹərʹ/, but often instead /-ədʹrʹ/, while in the relative and conjunct it is either /-ədʹər/ or /ədr/, in all cases presumably through confusion with deponent flexion. As can be seen from the examples, strong verbs which take the alternating pattern in the present (5.1.2.1) have an a-colour stem-final consonant in the passive present, both for the general and third person plural forms. The following table examines the imperfect passive forms of strong verbs.

Table 98. Imperfect passive flexion of strong verbs

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
do·beir	'gives'	BI	S1a	XVX-	·bʹar-
canaid	'sings'	BI	S1c	XVX-	kan-
		Absolute			
·bʹarʹ-θʹa∅ʹ	→	·bʹarʹθʹa∅ʹ	*do·berthe*		Ml83d9
·kan-θʹa∅ʹ	→	·kanʹtʹa∅ʹ	*no·cainte*		Ml102c8
		Relative			
·bʹarʹ-dʹəsʹ	→	·bʹarʹdʹəsʹ	*do·bertis*		Ml84c9

The endings of the imperfect passive are the same for strong and hiatus verbs as they are for weak verbs: /-əθ′a∅′/ for the general form and /-əd′əs′/ for the third person plural form. Strong verbs which take the alternating pattern in the present (see 5.1.2.1) have an i-colour stem-final consonant in the imperfect passive. Indeed, in the example given here, this is also the case for *canaid*, which takes the a-colour pattern in the present (see 5.1.2.2).

The above sections have laid out the present flexion of Old Irish verbs. Section 5.1 examined active flexion, concentrating on weak verbs in 5.1.1, strong verbs without a nasal infix in 5.1.2, nasal presents in 5.1.3, and hiatus verbs in 5.1.4. The current section focused instead on deponent flexion in 5.2.1, and on passive flexion in 5.2.2. The following chapter turns from the present to the other tense stems found in Old Irish: the subjunctive in 6.1, the future in 6.2, and the preterite in 6.3.

Chapter 6: The Old Irish subjunctive, future, and preterite stems

6.1. The subjunctive stem

This chapter examines the subjunctive, future and preterite stems in Old Irish. For reasons of space, a further stem, the preterite passive, has not been discussed in this thesis. As forms belonging to the subjunctive, future, and preterite are generally less thoroughly attested than present forms, active and deponent flexion are dealt with together in this chapter. Section 3.2, below, deals with the future stem, while 3.3 examines the various preterite formations, while the current section concentrates on the subjunctive stem.

Two main patterns may be identified in terms of the formation of the subjunctive stem. The first pattern, termed the s-subjunctive, occurs with nearly all strong verbs whose roots end in a dental or guttural stop or fricative (McCone 1987: 33).[312] The stem of the s-subjunctive is characterised by the replacement of the final consonant of the present stem by /-s-/, often also with changes in vocalism, discussed in detail below. All other verbs take what is traditionally referred to as an a-subjunctive, which can be modelled by the addition of an a-colour abstract consonant infix /-∅-/ to strong verbs.

In both a-subjunctive and s-subjunctive, there is a clear tendency to lower the stem vowel to /a/. The s-subjunctive takes the same person endings as strong verbs in the present, and exhibits the alternating pattern familiar from the most common class of

[312] This pattern is also found with roots ending in /-N/, although here it is possible to assume a root /-nd/, which doesn't interfere with the inflexion and simplifies the statement of the phonological conditioning. See subsections 3.3.1.4 and 3.3.3.1 for the behaviour of homorganic clusters of nasal and lenis obstruent in Old Irish.

strong verbs (see 5.1.2.1). In the a-subjunctive, on the other hand, there is no alternation in the final of the stems, but there are a different set of person endings to those used in the present (see 4.3.3).

In the following sections, the two subjunctive formations of Old Irish are outlined, beginning with the s-subjunctive, examined in subsection 6.1.1, and then going on to the a-subjunctive, discussed in 6.1.2.

6.1.1. The flexion of the s-subjunctive

The s-subjunctive characterises all strong verbs ending in a dental or guttural stop or fricative, with the exception of *aigid* 'drives' and *ad·gládathar* 'addresses'. The stem of the s-subjunctive is formed by replacing the final consonant of the present stem by /-s-/. In addition to this, some verbs display a long vowel in the s-subjunctive where the corresponding present forms have a short vowel.

Where the root ends in a cluster of /-r-/ or /-l-/ and an obstruent, the obstruent is transformed to /-s-/ normally, but is then assimilated to the preceding obstruent, yielding /-R-/ and /-L-/ respectively. For example *fo·ceird* 'throws' has the indicative stem /k′ard-/, yielding a subjunctive stem /k′ars-/, which after assimilation becomes /k′aR-/. Similarly, *orcaid* 'kills, slays', with present stem /∅°arg-/ has a subjunctive stem /∅°ars-/, which is regularly realised as /∅°aR-/.[313] These verbs never show the vowel lengthening shown in many other s-subjunctive formations.

For verbs whose roots are monosyllabic and have initial a-colour or u-colour a long vowel in the subjunctive is regular[314] and can be represented by means of an abstract consonant immediately preceding the characteristic /-s-/ formative of the s-subjunctive. The colour of this abstract consonant appears to depend on that of the initial of the root, i.e. a-colour or u-colour where appropriate.

Some verbs whose roots begin with i-colour also have a long vowel or diphthong in the s-subjunctive, whereas others do not. A long vowel or diphthong is generally predictable in those cases in which the present stem also has a long vowel,

[313] Historically grouped with these, but synchronically irregular, is *mligid* 'milks', with the subjunctive stem *mell-*.
[314] The verb *aingid* 'protects' has a short vowel in the subjunctive, but appears to have a disyllabic root. I also assume the root *leg-* for *laigid* 'lies' in making this generalisation.

e.g. *téit* ‘goes’, with the subjunctive stem *tías*-. A possible exception may be *ad·fét* ‘tells, relates’, which seems to have a short vowel in the s-subjunctive (*GOI*: §615). It should be noted however that the subjunctive stem of this verb is liable to confustion with that of *fichid* ‘fights’ on the one hand, and *ro·finnadar* ‘gets to know’ on the other, making analogical levelling a distinct possibility.

A long vowel or diphthong in the s-subjunctive is also predictable in those instances in which the present stem has a nasal before the final obstruent. This includes both verbs from Thurneysen’s BIII class, in which the nasal is infixed before an obstruent (see 6.3.1), *dringid* ‘climbs, advances’,[315] as well as a number of verbs in which the nasal is not confined to the present, but occurs also in the preterite, e.g. *in·gleinn* ‘investigates’ (with /-nd/) and *cingid* ‘steps’. The inclusion of both categories suggests that to a large degree the subjunctive stem is structurally modelled on the present, so much being true equally for the a-subjunctive, discussed in 6.1.2, below. The abstract consonant for these verbs would appear to be /-∅-/, on the evidence of passive third person plural *for·ndiassatar* (Ml39b12), from *for·ding* ‘oppresses’, although whether this is original or not is difficult to determine (see *GOI*: §617).

Among those verbs not included in the above categories, i.e. those with root-initial i-colour which do not have a long vowel or nasal in the present, vowel length in the subjunctive does not appear to be conditioned by any phonological factors that I can determine. Therefore, the long vowel in the subjunctive is not synchronically predictable for verbs such as *nigid* ‘washes’, *snigid* ‘drips’ and compounds of *reg*-, such as *con·rig* ‘binds’, all of which are inflected like *téit* ‘goes’,[316] and verbal compounds based on *icc*-, such as *con·icc* ‘is capable of’, *con-ricc* ‘meets, joins’, and *do·icc* ‘comes’, which exceptionally have have <í> in the s-subjunctive.

The stem vowel of the s-subjunctive is nearly always /a/, although there are exceptions, most notably the forms of compounds based on *icc*-, just mentioned, for which the subjunctive stem is *ís*-, and the suppletive stem *lú*- which is used for the subjunctive of *ibid* ‘drinks’. A number of verbs show different initial consonant colour in their

[315] It is unclear whether the vowel in the subjunctive forms of *ro·finnadar* ‘gets to know’ was long, short or variable in Old Irish. I have marked it appears in the spelling in the examples below.
[316] Watkins (1962: 129) shows these verbs as having a long vowel **ē* historically and includes also *fichid* ‘fights’ and *ad·fét* and *in·fét* ‘tells, relates’ in their number. However, the orthography marginally favours Thurneysen’s contention (*GOI*: §615) that the vowel in these latter formations was actually short in Old Irish.

subjunctive stems than in their roots. This includes *guidid* ‘prays, asks’ and *bruinnid* ‘springs forth, flows’, as well as their compounds, which take the i-colour pattern in the present (5.1.2.3), and was probably also the case for *scoichid* ‘moves, proceeds’, which is meagrely attested in the subjunctive.

As mentioned above, in general, the flexion of the s-subjunctive mirrors that of the alternating pattern of strong verbs in the present (5.1.2.1), with the same alternation in colour of the stem-final consonant, conditioned by the person and number of the verb. However, some verbs, most notably *saigid* ‘approaches, seeks’ and *orcaid* ‘kills, slays’, as well as their compounds, appear to take rather the a-colour pattern, discussed in 5.1.2.2. The person endings of the s-subjunctive also generally correspond to that of the present strong verbs, outside of the third person singular, where they differ considerably. These differences have already been outlined in 4.3.3 and are discussed in more detail in the relevant sections below.

A small number of s-subjunctives have deponent flexion. These include *midithir* ‘judges’ and *ro·finnadar* ‘gets to know’, which are deponent also in the present, as well as *ithid* ‘eats’, which takes deponent flexion in the s-subjunctive, but has active forms in the present. The deponent forms are included in the general discussion below.[317]

The following subsections examine the flexion of the s-subjunctive. Subsection 6.1.1.1, below, looks at active and deponent forms, while subsection 6.1.1.2 examines rather passive flexion.

6.1.1.1. Active and deponent flexion of the s-subjunctive

This subsection examines the active and deponent flexion of the s-subjunctive, while subsection 6.1.1.2, below, looks at passive forms. The forms in this section are ordered as usual by person and number, and discussion of deponent forms has been integrated with that of the more common active ones except in the third person singular, where there is sufficient attestation to justify dealing with them separately. The table below presents the first person singular forms of the s-subjunctive.

[317] There are also traces of an s-subjunctive with some hiatus verbs (see McCone 1987: 33). For discussion of these, and for the historical development of the s-subjunctive more generally, the reader should consult the highly influential contribution of Watkins (1962).

Table 99. 1st person singular flexion of the s-subjunctive

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
téit	‘goes’	BI	S1a	XVX-	t′a∅ɣ- → t′a∅s-
do·tét	‘comes’	BI	S1b	XVX-	·t′a∅ɣ- → ·t′a∅s-
fo·loing	‘supports’	BIII	S1d	XVX-	·L˚aɣ- → ·L˚a∅˚s-
teichid	‘flees’	BI	S1a	XVX-	t′ax- → t′as-
laigid	‘lies’	BI	S1a	XVX-	L′əɣ- → L′as-
do·tuit	‘falls’	BI	S1b	XVX-	·t˚ət- → ·t˚as-
ro·finnadar	‘gets to know’	BV	S3	XVX-	·φ′ən˚d˚- → ·φ′a(∅)s-
con·icc	‘is capable of’	BI	S1a	XVX-	·∅′ək- → ∅′ə∅′s-
		Absolute			
t′a∅s-ə∅˚	→	t′a∅s˚ə∅˚	*thiasu*[318]		Wb23c31
		Conjunct			
·t′a∅s-∅˚	→	·t′a∅s˚	*du·tías*		Wb1a7
·L˚a∅˚s-∅˚	→	·L˚a∅˚s˚	*fu·lós*		Ml33a2
·t′as-∅˚	→	·t′as˚	*no·tes*		Ml29d2
·L′as-∅˚	→	·L′əs˚[319]	*i·llius*		Thes.ii 357.17
·R˚a^{L}-t˚əs-∅˚	→	·R˚aθ˚əs˚	*do·ro-thus*[320]		Ml23c23
		Deponent conjunct			
·φ′a∅s-ər˚	→	·φ′a∅s˚ər˚	*co·fiasur*		LU3373
·φ′as-ər˚	→	·φ′as˚ər˚	*co·fessur*		SR2883
		Imperfect			
·t′a∅s′-əN′	→	·t′a∅s′əN′	*no·théisinn*		Ml41d9
·k˚əμ-∅′ə∅′s′-əN′	→	·k˚əμ′s′əN′	*ni·cuimsin*		Wb17b11

The table below shows the first person singular forms of the s-subjunctive. The absolute first person singular has the person ending /-ə∅˚/, as in the indicative. I am unaware of any cases of the alternative ending /-əm′/, but there are few surviving examples. The conjunct first person singular ending is /-∅˚/, although because the final consonant is <s> the orthography is not always unambiguous in marking the u-colour (see 3.1.2). The deponent conjunct takes the ending /-ər˚/ and the variety in the vocalism of the forms of *ro·finnadar* ‘gets to know’ may indicate free variation between a long and short vowel, as Thurneysen suggests (*GOI*: §615). The ending of the imperfect is regularly /-əN′/. This concludes the discussion of the first person singular forms of the s-subjunctive. The following table looks rather at the second person singular forms.

[318] Lenited after *cia* ‘who?’.
[319] I presume the high vowel here to reflect the frequent raising before this ending found also in the present (see 6.2.1).
[320] With the preverb *ro-* /R˚a-/ with potential meaning.

Table 100. 2nd person singular flexion of the s-subjunctive

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
téit	‘goes’	BI	S1a	XVX-	t′a∅ɣ- → t′a∅s-
reithid	‘runs’	BI	S1a	XVX-	R′aθ- → R′as′-
saigid	‘approaches, seeks’	BI	S1a	XVX-	saɣ- → sa∅s-
for·tét	‘helps, assists	BI	S1b	XVX-	·t′a∅ɣ- → ·t′a∅s-
in·gleinn	‘investigates’	BI	S1a	XVX-	·g′l′and- → ·g′l′a∅s′-
guidid	‘prays, asks’	BII	S2	XVX-	g°əð- → g′as′-
fo·ceird	‘throws’	BI	S1a	XVX-	·k′ard- → ·k′ar′s- → ·k′aR′-
ro·finnadar	‘gets to know’	BV	S3	XVX-	·φ′ən°d°- → ·φ′a(∅)s-

Absolute				
t′a∅s′-ə∅′	→	t′a∅s′ə∅′	*théisi*	MF 80.16
R′as′-ə∅′	→	R′as′ə∅′	*ressi*	MF 80.16
sa∅s-a∅′	→	sa∅sa∅′	*sasae*	LGÉ 282.7
Conjunct				
·t′a∅s′-∅′	→	·t′a∅s′	*for·téis*	Ml78c1
·g′l′a∅s′-∅′	→	·g′l′a∅s′	*in·gléis*	Ml140c7
·g′as′-∅′	→	·g′as′	*no·n-geiss*[321]	Wb30b4
·k′aR′-∅′	→	·k′aR′	*fo·ceirr*	Wb13c24
Deponent conjunct				
·φ′a∅s′-ər	→	·φ′as′ər′	*ro·fésser*	Fél Feb 4
Imperfect				
·t′a∅s-ta∅	→	·t′a∅sta∅	*no·tíasta*	LL284b14
·φ′as-ta∅	→	·φ′a∅sta∅	*ro·festa*	Wb10a10

For the second person singular, /-ə∅′/ is the basic absolute ending for verbs taking a s-subjunctive, as in the indicative, but there is at least one example, although relatively late, with /-a∅′/ and stem-final a-colour, *sásae* from *saigid* ‘approaches, seeks’. This probably shows the influence of the a-subjunctive, where a-colour and this ending are regular, although the stem-final a-colour may reflect the trace of a-colour inflexion as in 5.1.2.2 (see also below).

The exponence of the conjunct second person singular is i-colour, so a zero ending would be possible here were it not for the occurrence of an i-colour ending also in the subjunctive of *orcaid*, i.e. *nis·roirr* (Ar. iii 318 §65), which otherwise follows the a-colour pattern. Accordingly, I have written /-∅′/ throughout, as in the present. The deponent conjunct ending is /-ər/, and the imperfect ending is the typical sigmatic ending /-ta∅/ (see 4.3.3). The following table looks at third person forms of the s-subjunctive.

[321] The initial of the stem is nasalised here as it is relative.

Table 101. Active 3rd person singular flexion of the s-subjunctive

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
téit	‘goes’	BI	S1a	XVX-	t′a∅ɣ- → t′a∅s-
orcaid	‘kills, slays’	BI	S1c	XVX-	∅˚arg- → ∅˚ars- → ∅˚aR-
guidid	‘prays, asks’	BII	S2	XVX-	g˚əð′- → g′as′-
do·tét	‘comes’	BI	S1b	XVX-	·t′a∅ɣ- → ·t′a∅s-
fo·loing	‘supports’	BIII	S1d	XVX-	·L˚aɣ- → ·L˚a∅˚s-
do·boing	‘plucks away’	BIII	S1d	XVX-	·b˚aɣ- → ·b˚a∅˚s′-
aingid	‘protects’	BI	S1a	XVX-	∅an′əɣ- → ∅an′as′-
ro·saig	‘reaches, arrives’	BI	S1a	XVX-	·saɣ- → ·sa∅s-
fris·oirc	‘offends’	BI	S1c	XVX-	·∅˚arg- → ·∅˚ars- → ·∅˚aR-
saigid	‘approaches, seeks’	BI	S1a	XVX-	saɣ- → sa∅s-
do·díat	‘leads down’	BI	S1b	XVX-	d′ə∅′əd- → ·d′ə∅′as′-
teichid	‘flees’	BI	S1a	XVX-	t′ax- → t′as-

Absolute				
t′a∅s′-	→	t′a∅s′	*théis*[322]	Wb14a14
∅˚aR-	→	∅˚aR	*orr*	Sg12b7
Relative				
t′a∅s′-∅	→	t′a∅s	*tías*	Thes.ii 39.25
g′as′-∅	→	·g′as	*ṅges*	Ml39b3
Conjunct				
·t′a(∅s′)-	→	·t′a∅′	*do·théi*	Wb13a12
·L˚a(∅s′)-	→	·L˚a∅˚	*fo·lló*	Ml100d10
·b˚a(∅˚s′)-	→	·b˚a∅˚	*to·bó*[323]	CA§48
·g′a(s′)-	→	·g′a∅′	*ara·n-gé*[324]	Ml51a16d1
·∅an′(as′)-	→	·∅an′	*·ain*	Thes.ii 303.3
·R˚a^{L}-sa(∅s′)-	→	·R˚aha∅	*·roa*	SR1368
·∅˚aR-	→	·∅˚aR	*fris·n-orr*[325]	Ml15a10
Imperfect				
·∅˚aR-əθ	→	·∅˚aRaθ	*fris·n-orrad*[326]	Ml124d8
·sa∅s-əθ	→	·sa∅səθ	*con-ná·sásad*	Sg62b2
·d′ə∅′as′-əθ	→	·d′ə∅′s′əθ	*du-m·dísed*[327]	Ml78b18
·t′as′-əθ	→	·t′asaθ	*nu·tesed*	Ml29d9

In the third person singular of the s-subjunctive, the endings differ from those used in the present. The absolute is equivalent to the bare stem. This would normally have i-colour in line with the alternating pattern of stem-final consonant colour outlined in

[322] Lenited after *ma* ‘if’.
[323] Incorrectly labelled as a future in Meyer’s glossary of the text (Meyer 1905: 48).
[324] The initial of the stem is nasalised here as it is relative.
[325] The initial of the stem is nasalised here as it is relative.
[326] The initial of the stem is nasalised here as it is relative.
[327] With first person singular infix pronoun /-μ^{L}/.

5.1.2.1, although at least *orcaid* ‘kills, slays’ and *saigid* ‘approaches, seeks’ appear to reflect the a-colour pattern discussed in 5.1.2.2. As the stem already ends in /-s/, a-colour is the exponent of the absolute relative, expressed here with the formative /-∅/.

In the conjunct, the basic rule is that both the /-s-/ formative and the preceding specification, when it is not a stressed vowel, are deleted. This means that a short stem vowel is deleted alongside the /-s-/ formative when in unstressed position. Thus *·ain*, from a stem *aness*-, is the third person singular conjunct of *aingid* ‘protects’. However, when the vowel before the formative is long, it is rather the abstract consonant which is deleted, thus *·roa* from a subjunctive stem *sáss*-, is the third person singular of *ro·saig* ‘reaches, arrives’ (see the forms of *saigid* ‘seeks, approaches’ elsewhere in this subsection).[328] When the result of this operation is a simple XV- structure, as is often the case (see most of the examples above), this is repaired by consonant excrescence (see 3.3.2.3). As can be seen from the examples below, a final sonorant remains unaffected.

The ending for the imperfect is /-əθ/, where, *saigid* and *orcaid* similarly show a-colour inflexion. The following table looks at third person singular deponent forms of the s-subjunctive

Table 102. Deponent 3rd person singular flexion of the s-subjunctive

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
ithid	‘eats’	BI	S1a	XVX-	∅′əθ- → ∅′as-
midithir	‘judges’	BII	S2	XVX-	m′əð′- → m′as
ro·finnadar	‘gets to know’	BV	S3	XVX-	·φ′ən˚d˚- → ·φ′a(∅)s-
			Absolute		
∅′əs-t′r′	→	∅′əstər′		*estir*	Wb6b24
			Relative		
m′əs-tr	→	m′əstar		*mestar*	Ml127d12
			Conjunct		
∅′əs-tr	→	∅′əstar		*ni·estar*	Wb6b23
·φ′as-tr	→	φ′astar		*con·festar*	Wb12c38
			Imperfect		
·φ′a∅s′-əθ	→	·φ′a∅s′aθ		*ra·ḟesed*	Sg148a6

[328] The facts here are somewhat idealised, as there is considerable confusion and levelling (see *GOI*: §627; McCone 1987: 34). An identical rule obtains in the s-future, explored in subsection 6.2.2, below.

The deponent third person singular forms of the s-subjunctive have the sigmatic endings /-t′r′/ for the absolute and /-tr/ for absolute relative and conjunct. The imperfect ending is regularly /-əθ/. The next table examines the first person plural s-subjunctive forms.

Table 103. 1st person plural flexion of the s-subjunctive

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
guidid	'prays, asks'	BII	S2	XVX-	g°əð′- → g′as′-
imm·tét	'goes around'	BI	S1b	XVX-	·t′a∅ɣ- → ·t′a∅s-
in·fét	'tells, relates'	BI	S1b	XVX-	·φ′a∅ð- → ·φ′a(∅)s-
ro·finnadar	'gets to know'	BV	S3	XVX-	·φ′ən°d°- → ·φ′a(∅)s-
			Conjunct		
·t′a∅s-əμ	→	·t′a∅saμ		*im·thiasam*	Ml46c20
·g′as-əμ	→	·g′asaμ		*ni·gessam*	Wb11a24
			Imperfect		
·φ′as-əm′əs′	→	·φ′a∅səs′		*in·fesmais*	Ml17d8
·φ′as-əm′əs′	→	·φ′a∅səs′		*ro·fesmais*	LU6760
·g′as-əm′əs′	→	·g′asəs′		*no·gesmais*	Ml21b1

I am not aware of any examples of the absolute first person plural, but there is an example of the relative, where the ending is the regular /-əm′a∅′/. The conjunct ending is /-əμ/ and the imperfect ending /-əm′əs′/. The following table looks at the forms of the second person plural s-subjunctive.

Table 104. 2nd person plural flexion of the s-subjunctive

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
téit	'goes'	BI	S1a	XVX-	t′a∅ɣ- → t′a∅s-
ar·clich	'wards off'	BI	S1a	XVX-	·k′l′əx- → ·k′l′as′-
fris·oirc	'offends'	BI	S1c	XVX-	·∅°arg- → ·∅°ars- → ·∅°aR-
			Absolute		
t′a∅s-t′ə∅′	→	t′a∅stə∅′		*tíastai*	TBFr. 413
			Conjunct		
·t′a∅s-əθ′	→	·t′a∅s-əθ′		*ní·thessid*	LU4809
·k′l′as-əθ′	→	·k′l′asəθ′		*ara·clessid*	Ml22d18
			Imperfect		
·t′a∅s-t′a∅′	→	·t′a∅s′t′a∅′		*no·téssta*[329]	Wb9b19
·∅°aR-t′a∅′	→	·∅°aRθa∅′		*fris·orthe*	Wb10c2

[329] Pedersen (VGKii: 654) reads rather *nó·tresstæ* and sees this form as coming from *tréicid* 'abandons'. The i-colour of the stem final consonant (indicated by the occurrence of <é> rather than <ía>) is not easy to explain.

The absolute second person plural ending is the sigmatic ending /-tʼa∅ʼ/.[330] The conjunct ending is the regular /-əθʼ/, while that of the imperfect is the usual sigmatic ending /-tʼa∅ʼ/. The following table examines third person plural forms of the s-subjunctive.

Table 105. 3rd person plural flexion of the s-subjunctive

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
téit	'goes'	BI	S1a	XVX-	tʼa∅ɣ- → tʼa∅s-
fo·loing	'supports'	BIII	S1d	XVX-	·L˚aɣ- → ·L˚a∅˚s-
fris·oirc	'offends'	BI	S1c	XVX-	·∅˚arg- → ·∅˚ars- → ·∅˚aR-
guidid	'prays, asks'	BII	S2	XVX-	g˚əðʼ- → gʼasʼ-
ro·finnadar	'gets to know'	BV	S3	XVX-	·φʼən˚dʼ- → ·φʼa(∅)s-

		Absolute			
tʼa∅s-ədʼ	→	tʼa∅sʼədʼ		*tíasuit*	IT2.2 191.1
		Relative			
tʼa∅s-ədʼa∅ʼ	→	tʼa∅staʼ		*tíastae*	Fél Ep. 470
		Conjunct			
·L˚a∅s-əd	→	·L˚a∅sad		*fo·llosat*	Ml69a7
·∅˚aR-əd	→	·∅˚aRad		*fris·n-orrat*[331]	Ml80b9
		Imperfect			
·L˚a∅s-ədʼəsʼ	→	·L˚a∅sdəsʼ		*fo·lostais*	Ml104c5
·gʼas-ədʼəsʼ	→	·gʼasdəsʼ		*no·gestais*	Ml125a7
·φʼas-ədʼəsʼ	→	·φʼastəsʼ		*co·festais*	LU1833

The ending for the absolute third person plural is /-ədʼ/, although the example given below is late and does not reflect the usual Old Irish orthography. The relative ending is /-ədʼa∅ʼ/, while that of the conjunct is /-əd/ and the imperfect /-ədʼəsʼ/.

This subsection has summarised the active and deponent flexion of the s-subjunctive. The following subsection looks rather at the passive forms of this stem formation.

[330] It is interesting that a-colour is found in the stem-final consonant in the example below. As far as I am aware, there are no attested absolute second person plural forms for strong verbs with the alternating pattern. Given the flexional similarity of the s-subjunctive and the present alternating pattern, this is the best evidence available also for the situation in the latter, and suggests an a-colour stem-final consonant there as well (pace *GOI*: §558, which lists *beirthe*).

[331] The initial of the stem is nasalised here as it is relative.

6.1.1.2. Passive flexion of the s-subjunctive

This subsection examines the passive flexion of the s-subjunctive. These bear some similarities with those of the present passive of some verbs, in particular the special endings which are found in the general forms. Discussion begins with these general forms, before moving on to the third person plural forms, and then finally those of the imperfect subjunctive.

Table 106. Passive flexion of the s-subjunctive: general forms

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
guidid	'prays, asks'	BII	S2	XVX-	g˚əð′- → g′as′-
midithir	'judges'	BII	S2	XVX-	m′əð′- → m′as
ad·cid	'extends, stretches'	B	S	XVX-	·k′əð- → ·k′as-
		Absolute			
g′əs-r′	→	g′asər′	*gessir*		Wb17d27
m′əs-r′	→	m′asər′	*mesair*		Ml36a17
		Relative			
g′əs-r	→	g′asər	*ṅgesar*		Ml51a17
		Conjunct			
k′əs-r	→	k′asər	*as·cesar*		Ml44a4
m′əs-r	→	m′asər	*ni·messar*		Ml42d14

As can be seen from the table above, the general forms of the s-subjunctive passive take the same endings as the present passive of strong verbs, i.e. /-r′/ for the absolute and /-r/ for the relative and conjunct. The third person plural forms of the passive of the s-subjunctive are shown below.

Table 107. Passive flexion of the s-subjunctive: 3rd person plural forms

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
midithir	'judges'	BII	S2	XVX-	m′əð′- → m′as
for·ding	'oppresses'	BIII	S1d	XVX-	·d′əŋ′ɣ′- → ·d′a∅s-
		Relative			
m′əs-ədr	→	m′asadar	*messatar*		Ml70a9
		Conjunct			
·d′a∅s-ədr	→	·d′a∅sadar	*for·ndiassatar*		Ml39b12

With respect to the plural forms, I could not uncover any examples of the third person plural absolute, but the examples here from the relative and conjunct show /-ədr/, as might be expected. The imperfect passive forms are presented in the table below.

Table 108. Passive flexion of the s-subjunctive: imperfect forms

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
ad·anaig	‘escorts	BI	S1a	XVX-	·∅anəɣ′- → ·∅anas-
con·túairc	‘pounds’	BI	S1c	XVX-	·t°a∅rg- → ·t°a∅R-
		General			
·∅anəs-t′a∅′	→	·∅anasta∅′		*a-tom·anaste*[332]	Wb14c20
		3rd person plural			
t°a∅R-əd′əs′	→	·t°a∅rdəs′		*con·tuartis*	Ml54a18

In the passive of the imperfect s-subjunctive, the endings are the usual sigmatic ending /-t′a∅′/ for the general form and /-əd′əs′/ for the third person plural.

These examples conclude the discussion of the flexion of the s-subjunctive. The following section turns rather to the other subjunctive pattern, the a-subjunctive.

6.1.2. The flexion of the a-subjunctive

All verbs which do not take an s-subjunctive take an a-subjunctive instead. Characteristic of the a-subjunctive is stem-final a-colour for all strong verbs. Thus, even those verbs which consistently have stem-final i-colour in the present (see 5.1.2.3) have a-colour throughout the subjunctive, e.g. present third person singular *gaibid* ‘takes’, but subjunctive *gabaid*. Weak verbs never show this alternation and retain the original colour of the root-final consonant also in the subjunctive stem, e.g. third person singular conjunct *nach·moidea* (Wb2b4) from *moídid* ‘boasts’.

As for verbs with XV- roots, they have hiatus forms which seem to suggest an a-colour abstract consonant e.g. *ni·riae* (Strachan 1904: 199.7) from *renaid* ‘sells’, which suggests the representation /·R′a∅a∅′/. However, in the forms which take disyllabic endings, syncope results in a short vowel for these verbs, as outlined in 3.3.2.1, e.g. third person plural relative *glete* (Ml27b16), from *glenaid* ‘sticks’, although the orthography is ambiguous.

It seems that *ad·cí* ‘sees’ must be kept apart. It takes deponent flexion in the subjunctive and the orthography points towards an i-colour abstract consonant, e.g. first person singular imperfect subjunctive *at·cheind* (TBC4142) and first person singular

[332] With first person singular infix pronoun /-d°am^{L}/.

present subjunctive *ad·cear* (Thes.ii 293.6), not ***ad·ciar*., which is the form one might expect if the abstract consonant had a-colour. Thus, although these examples are quite late and quite early respectively, neither of them display the breaking associated with the constellation /C′a∅/, discussed in 3.2.3.3 and 3.2.3.4. and thus point rather towards i-colour, i.e. /·x′a∅′əN/ and /·k′a∅′ar/.

Given this contradictory evidence, I have written an a-colour abstract consonant in the hiatus forms of verbs with initial i-colour and XV- roots in the active flexion, but not with *ad·cí* 'sees', which takes deponent flexion. This situation somewhat resembles that of the s-subjunctive, discussed in 6.1.1, above, where verbs whose roots have initial i-colour frequently show vowel lengthening with /∅/ rather than /∅′/, e.g. first person plural conjunct *·tiasam*, from *téit* 'goes', not ***·téisem*.

As well as the final a-colour consistently found with strong verbs, a number also show changes in the colour of the initial of the stem between present and subjunctive. These verbs, discussed in 4.3.2, include *at·baill* 'dies', *marnaid* 'betrays, deceives', *do·moinethar* 'supposes' and *gainithir* 'is born. In each case, the stem-initial has i-colour in the subjunctive. The hiatus verb *foid* 'overnights' is attested with both initial u-colour and initial i-colour (Binchy 1938: 34 §44) in the subjunctive, but the latter seems to underlie the formation of the future.

The stressed stem vowel of forms of the a-subjunctive is almost always /a/, although there are exceptions. Where the root itself has a long vowel, the original vocalism is retained, e.g. subjunctive *fu·lina* (Ml45c10) from present *fo·lina* 'fills up, supplies' (Ml122d5), both with /ə∅′/. This lowering may be posited independently of the stem-final a-colour which occurs with strong verbs, as evidenced by the forms of *ad·cí* discussed above.

The common verbs *biid* 'is' and *gniid* 'does, makes', as well as compounds built on them, have aberrant flexion. McCone (1987: 35) describes these verbs in terms of an independent stem formation, the e-subjunctive, and states "the e-subjunctive with stressed root never displays hiatus". The variation in spelling between <e> and <ei> for the third person singular and the various plural forms appears to confirm this, although the absolute first person singular is more ambiguous. It is clear from the spelling <eu, eo>, rather than <éu, éo> in *GOI* (§787) that Thurneysen considered the absolute first person singular to indeed display hiatus. Unfortunately, the absolute second person singular is practically unattested, and the one instance that is known to me, spelled *bee*,

may represent the conjunct. The only solution, unsatisfactory as it may be, is to consider the subjunctive stems of these two verbs to be /bʹa-/ and /gʹnʹa-/, respectively, with the typical low vowel of the subjunctive, and to stipulate exceptional syncope with vowel initial endings.

The person endings of the a-subjunctive are identical to those found in the present stem in the plural and throughout the imperfect, but in the present singular they differ. These differences are discussed in 4.3.3.1 and in the relevant paragraphs below. As stated above, the common verb *ad·cí* 'sees' take deponent flexion in the subjunctive, while the present has rather active flexion.

The following subsections give examples, divided by person and number, for the flexion of the a-subjunctive. Deponent forms and active forms are covered side by side in 6.1.2.1, while passive forms are discussed in 6.1.2.2.

6.1.2.1. Active and deponent flexion of the a-subjunctive

This section examines the active and deponent flexion of the a-subjunctive, while the passive is dealt with in 6.1.2.2. Discussion begins with the first person singular forms.

Table 109. 1st person singular flexion of the a-subjunctive

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
pridchaid	'preaches'	AI	W1	XVXVX-	pʹrʹəðˤəx-
biid	'does be'	AIII	H2	XV-	bʹə- → bʹa-
fo·daim	'suffers, endures'	BII	S2	XVX-	·daμʹ- → daμʹ-
glenaid	'sticks'	BIV	S3	XVX-	gʹlʹə- → gʹlʹa-
do·gní	'does, makes'	AIII	H2	XVX-	gʹnʹə- → ·gʹnʹa-
ad·cí	'sees'	AIII	H2	XVX-	·kʹə- → ·kʹa-
ro·cluinethar	'hears'	BV	S3	XV-	kˤlˤə- → kˤlˤa-
beirid	'carries	BI	S1a	XVX-	bʹar-
		Absolute			
pʹrʹəðˤəx-a∅	→	pʹrʹəðˤxˤa∅	*pridcha*		Wb10d23
bʹa-ə∅ˤ	→	bʹa∅ʹə∅ˤ	*beo*		Wb23b41
		Conjunct			
·daμ-	→	·daμ	*fa·dam*		Wb29d27
·gʹlʹa-∅ˤ	→	·gʹlʹa∅ˤ	*coni·gléu*		Ml86b8
·gʹnʹa-∅ˤ	→	·gʹnʹa∅ˤ	*du·gneu*		Ml23c24
		Deponent conjunct			

·kʹa-ər˚	→	·kʹa∅ʹər˚	*at·cheur*	Ériu 2[333]
·k˚l˚a-ər˚	→	·k˚l˚a∅˚ar˚	*ro·cloor*	Wb23d2
		Imperfect		
·bʹar-əNʹ	→	·bʹarəNʹ	*nos·berinn*[334]	Wb10d36
·bʹa-əNʹ	→	·bʹaNʹ	*ni·beinn*	Ml131d19
·kʹa-əNʹ	→	·kʹa∅ʹəNʹ	*at·cheind*	TBC4142

In the first person singular conjunct of the a-subjunctive, verbs with XV- roots take the regular primary ending /-∅˚/, while for all other verbs the first person singular is equivalent ot the bare stem. Similarly, in the absolute, the substantive verb seems to have /-ə∅˚/, which might be hypothesised also for other verbs with XV- roots, while elsewhere the ending appears to be rather /-a∅/, although there or few examples. Similar variation is found in the deponent, e.g. *at·cheur* and *ad·cear* (Thes. ii 293.6) from *ad·cí* 'sees', while *ro·cloor* has rather /-ar˚/ (cf. 5.1.1.2). The imperfect, as usual, has /-əNʹ/.[335] The following table shows the second person singular forms.

Table 110. 2nd person singular flexion of the a-subjunctive

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
caraid	'loves'	AI	W1	XVX-	kar-
do·lugai	'forgives'	AII	W2b	XVX-	L˚əɣ˚- → L˚aɣ˚-
ad·suidi	'suffers, endures'	AII	W2b	XVX-	s˚əðʹ- → s˚aðʹ-
crenaid	'buys'	BIV	S3	XVX-	kʹrʹə- → kʹrʹa-
soid	'turns'	AIII	H3	XV-	s˚a-
ro·cluinethar	'gets to know'	BV	S3	XV-	k˚l˚ə- → k˚l˚a-
in·samlaithir	'imitates'	AI	W1	XVXVX-	·saμal-
boccaid	'makes soft'	AI	W1	XVX-	b˚ak-
do·gní	'does, makes'	AIII	H2	XVX-	gʹnʹə- → ·gʹnʹa-
biid	'does be'	AIII	H2	XV-	bʹə- → bʹa-
		Absolute			
kar-a∅ʹ	→	kara∅ʹ	*care*		Ml43a21
bʹa-a∅ʹ	→	bʹa∅ʹa∅ʹ	*bee*		ZCP7[336]
		Conjunct			
·L˚aɣ˚-a∅ʹ	→	·L˚aɣ˚a∅ʹ	*du·logae*		Ml138b7
·s˚aðʹ-a∅ʹ	→	·s˚aðʹa∅ʹ	*ad·sode*		Wb10a9
·kʹrʹa-a∅ʹ	→	·kʹrʹa∅a∅ʹ	*ni·crie*		ZCP13[337]

[333] Byrne (1905: 89 §2).
[334] With third person plural infix pronoun /-s-/.
[335] Although *fo·luinn* (Ml140b8) from *fo·luathar* 'flies' is listed as first person singular imperfect subjunctive in both DIL and the dictionary of the Milan glosses, it does not show the typical lowering of the subjunctive and formally resembles rather a present (cf *no·luind* LU1325).
[336] Stern (1910: 484.13). This may well represent the conjunct form, although Thurneysen considers it the absolute (*GOI*: §787).

·s°a-a∅′	→	·s°a∅°a∅′	*no·soe*	Ml44b14
·g′n′a-a∅′	→	·g′n′a∅′	*do·gné*	Wb32a24
		Deponent conjunct		
·k°l°a-əθ′ər	→	·k°l°aθ′ər	*con-dam·cloither*	Ml21b6
·saμal-əθ′ər	→	·saμaltar	*in·samailter*[338]	Ml56b38
		Imperfect		
·b°ak-əθa∅	→	·b°akθa∅	*·boccth*a	Wb5b32
·b′a-əθa∅	→	·b′aθa∅	*no·m-betha*[339]	Wb4c24

The absolute and conjunct second person singular both have the ending /-a∅′/.[340] The forms of *biid*, *gniid* and their compounds show exceptional loss of hiatus, as discussed above. The deponent conjunct has the ending /-əθər/, while, as per usual, that of the imperfect is /-əθa∅/. The following table shows the third person singular forms.

Table 111. 3rd person singular flexion of the a-subjunctive

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
guirid	‘warms, burns’	AII	W2b	XVX-	g°ər′- → g°ar′-
beirid	‘carries	BI	S1a	XVX-	b′ar-
techtaid	‘has, possesses’	AI	W1	XVX	t′axt-
ro·cluinethar	‘gets to know’	BV	S3	XV-	k°l°ə- → k°l°a-
do·moinethar	‘supposes’	BII	S2	XVX-	·m°an′- → ·m′an-
moídid	‘boasts’	AII	W2a	XVX-	m°a∅′d′-
as·ren	‘pays out, expends’	BIV	S3	XV-	·R′ə- → R′a-
as·beir	‘says’	BI	S1a	XVX-	·b′ar-
baid	‘dies’	AIII	H1	XV-	ba-
biid	‘does be’	AIII	H2	XV-	b′ə- → b′a-
do·gní	‘does, makes’	AIII	H2	XVX-	·g′n′ə- → ·g′n′a-
		Absolute			
g°ar′-əθ′	→	g°ar′əθ′	*gorith*		Cam37d
b′ar-əθ′	→	b′arəθ′	*beraid*		Ml37a9
b′a-əθ′	→	b′aθ′	*beith*		Wb20b13
		Relative			
t′axt-əs	→	t′axtas	*techtas*		Wb12d41
b′a-əs	→	b′as	*bess*		Wb5d14
		Conjunct			
·ma∅′d′-a∅	→	·ma∅′d′a∅	*nach·moidea*		Wb2b4
·R′a-a∅	→	·R′a∅a∅	*as·ria*		Ml127a18
·g′n′a-a∅	→	·g′n′a∅	*do·gné*		Wb12c46

[337] Meyer (1921: 21.33).
[338] The i-colour cluster in this form is unexpected.
[339] The initial of the stem is nasalised here as it is relative.
[340] The form of the substantive verb, which seems to contradict McCone’s (1987: 35) statement that these verbs “never display hiatus”, is contested.

Deponent conjunct				
·kˠlˠa-əθr	→	·kˠlˠa∅ˠaθar	*ro-dom·chloathar*[341]	Thes.ii 358.2
·mʹan-əθr	→	·mʹanaθar	*du·menathar*	Ml49a15
Imperfect				
·bʹar-əθ	→	·bʹaraθ	*as·berad*	Ml13a13
·ba-əθ	→	·ba∅aθ	*no·m-báad*[342]	Sg216a4
·Rʹa-əθ	→	·Rʹa∅aθ	*as·riad*	Ml36a29
·gʹnʹa-əθ	→	·gʹnʹað	*do·gneth*	Sg21b6

The ending of the a-subjunctive absolute third person singular is /-əθʹ/, as in the present and the s-subjunctive. The conjunct ending however, is /-a∅/. Elsewhere, the usual endings are used: /-əs/ for the absolute relative, /-əθr/ for the deponent conjunct, and for the imperfect /-əθ/. As in other persons, the forms of *biid* and *gniid* and compounds exhibit exceptional syncope of their second vowel, leading to loss of hiatus, as can be seen from the absolute and relative forms of *biid* and the conjunct form of *do·gní* 'does, makes'. The first person plural forms of the a-subjunctive are shown in the next table.

Table 112. 1st person plural flexion of the a-subjunctive

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
móraid	'praises, magnifies'	AI	W1	XVX-	mˠa∅ˠr-
biid	'does be'	AIII	H2	XV-	bʹə- → bʹa-
techtaid	'has, possesses'	AI	W1	XVX	tʹaxt-
as·beir	'says'	BI	S1a	XVX-	·bʹar-
ro·cluinethar	'gets to know'	BV	S3	XV-	kˠlˠə- → kˠlˠa-
ailid	'nourishes, rears'	BI	S1a	XVX-	∅al-
Absolute					
mˠa∅ˠr-əmʹə∅ʹ	→	mˠa∅ˠrmə∅ʹ	*mórmai*		*GOI*§598
bʹa-əmʹə∅ʹ	→	bʹamʹə∅ʹ	*bemmi*		Wb31c11
Relative					
tʹaxt-əmʹa∅ʹ	→	tʹaxtma∅ʹ	*techtmae*		Ml18d9
Conjunct					
·bʹar-əμ	→	·bʹaraμ	*as·beram*		Ml2a13
·bʹa-əμ	→	·bʹaμ	*im·bem*		Wb25c12
Deponent conjunct					
·kˠlˠa-əmr	→	·kˠlˠa∅amar	*ro·cloammar*		Ml112b12
Imperfect					
∅al-əmʹəsʹ	→	·∅alməsʹ	*non·almais*		Ml104d16
·bʹa-əmʹəsʹ	→	·bʹamʹəsʹ	*no·bemmis*		Ml134b3

[341] With infix pronoun first person singular /-dˠaμ^{L}/.
[342] The initial of the stem is nasalised here as it is relative.

The absolute first person plural ending is the usual /-əmʼəØʼ/, while the relative ending is /-əmaØʼ/. The active conjunct ending is /-əμ/ while the deponent conjunct ending is the usual form /-əmr/. The imperfect ending is /-əmʼəsʼ/. These endings are in all cases identical to those of the present and s-subjunctive, as is the case throughout the plural forms of the a-subjunctive, but in contrast to the singular, where the endings differ from those used in the present and a-subjunctive (see 4.3.3.1). The following table shows the second person plural forms of the a-subjunctive.

Table 113. 2nd person plural flexion of the a-subjunctive

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
foilsigidir	'shows'	AII	W2a	XVXV-ig-	φ˚alʼsʼə-əɣʼ-
biid	'does be'	AIII	H2	XV-	bʼə- → bʼa-
do·beir	'gives'	BI	S1a	XVX-	·bʼar-
as·luí	'escapes'	AIII	H3	XV-	·L˚ə- → ·L˚a-
do·lugai	'forgives'	AII	W2b	XVX-	·L˚əɣ˚- → ·L˚aɣ˚-
do·gní	'does, makes'	AIII	H2	XVX-	gʼnʼə- → ·gʼnʼa-

Absolute				
ˈφ˚alʼsʼə-ˌəɣʼ-əθʼaØʼ	→	ˈφ˚alʼˌsʼəɣʼθʼaØʼ	*foilsigthe*	Ml56c2
bʼa-əθʼaØʼ	→	bʼaθʼaØʼ	*beithe*	Wb18b16

Conjunct				
·bʼar-əθʼ	→	·bʼarəθʼ	*do·m-beraid*[343]	Wb8d21
·L˚ə-əθʼ	→	·L˚aØ˚əθʼ	*at·loid*	Wb26a2
·L˚aɣ-əθʼ	→	·L˚aɣa-əθʼ	*du·logaid*	Ml65a10
·gʼnʼa-əθʼ	→	·gʼnʼaθʼ	*do·gneid*	Wb5d30

Imperfect				
·bʼar-əθʼaØʼ	→	·bʼarθaØʼ	*do·berthe*	Ml15d8
·gʼnʼa-əθʼaØʼ	→	·gʼnʼaθaØʼ	*do·gnethe*	Wb9d25

In the a-subjunctive, the absolute second person plural ending is /-əθaØʼ/, and the imperfect has the same ending. The conjunct second person plural has the ending /-əθʼ/. The orthography of the conjunct form *do·gneid* (Wb5d30) could theoretically stand for either a short vowel or two vowels in hiatus, but it as been assumed here that it represents the short vowel, in line with the general principles outlined for *biid*, *gniid* and their compounds at the beginning of this subsection. The following table shows the third person plural forms of the s-subjunctive.

[343] The initial of the stem is nasalised here as it is relative.

Table 114. 3rd person plural flexion of the a-subjunctive

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
molaid	‘praises’	AI	W1	XVX-	m˚al-
biid	‘does be’	AIII	H2	XV-	b′ə- → b′a-
beirid	‘carries’	BI	S1a	XVX-	b′ar-
gniid	‘does, makes’	AIII	H2	XVX-	g′n′ə- → g′n′a-
glenaid	‘sticks’	BIV	S3	XVX-	g′l′ə- → g′l′a-
renaid	‘sells’	BIV	S3	XVX-	R′ə- → R′a-∅-
for·fen	‘finishes’	BIV	S3	XV-	φ′ə- → ·φ′a-
as·luí	‘escapes’	AIII	H3	XV-	·L˚ə- → ·L˚a-
foid	‘overnights’	AIII	H3	XV-	φ˚a-
for·ása	‘grows, increases’	AI	W1	XVX-	·∅a∅s-
gaibid	‘takes’	BII	S2	XVX-	gaβ′- → gaβ-
cloid	‘turns back’	AIII	H3	XV-	k˚l˚a-
baid	‘dies’	AIII	H1	XV-	ba-
ciid	‘weeps’	AIII	H2	XV-	k′ə- → k′a-

Absolute				
m˚al-əd′	→	m˚aləd′	*molait*	Ml61c10
b′a-əd′	→	b′ad′	*beit*	Sg203b8
Relative				
b′ar-əd′a∅′	→	b′arda∅′	*berte*	Wb9c12
g′n′a-əd′a∅′	→	g′n′ad′a∅′	*gnete*	Wb10c22
g′l′ə-əd′a∅′	→	g′l′ad′a∅′	*glete*	Ml127b19
Conjunct				
·R′a-∅-əd	→	·R′a∅ad	*ní·riat*	Wb28c2
·φ′a-∅-əd	→	·φ′a∅ad	*for·fiat*	Ml23a19
·L˚ə-əd	→	·L˚a∅ad	*as·loat*	Anecd. 3[344]
·φ˚a-əd	→	·φ˚a∅ad	*·foat*	ZCP 8[345]
·∅a∅s-əd	→	·∅a∅sad	*for·ásat*	Ml40b4
·b′a-əd	→	·b′ad	*ni·bet*	Ml35d24
Deponent conjunct				
·k˚l˚a-∅-ədr	→	·k˚l˚a∅adar	*ro·cloatar*	Ml70a2
Imperfect				
·gaβ′əd′əs′	→	·gaβ′d′əs′	*nu·gabtis*	Ml39c15
·k˚l˚a-əd′əs′	→	·k˚l˚ad′əs′	*con-id·cloitis*[346]	Ml112b20
·ba-əd′əs′	→	·bad′əs′	*no·m-batis*	Ml40a2
·k′a-əd′əs′	→	·k′ad′əs′	*ní·cetis*	Wb10b6
·b′a-əd′əs′	→	·b′ad′əs′	*no·m-betis*[347]	Sg39a25

[344] O’Keefe (1910: 24.15).
[345] Meyer (1912a: 196.19).
[346] With masculine third person singular infix pronoun /-∅′əð′^{N}/.
[347] The initial of the stem is nasalised here as it is relative.

As can be seen from the table, the absolute ending of the third person plural of the a-subjunctive is /-əd′/ and the absolute relative /-əd′a∅′/. In the conjunct, the endings are the usual /-əd/ for the active and /-ədr/ for the conjunct. The imperfect has, typically, the ending /-əd′əs′/.

This concludes the examination of the active and deponent forms of the a-subjunctive. The following subsection looks rather at the passive forms of the a-subjunctive.

6.1.2.2. Passive flexion of the a-subjunctive

This subsection examines the passive flexion of the a-subjunctive. Unlike in the present passive, and in the passive of the s-subjunctive, strong verbs and weak verbs are conjugated identically in the a-subjunctive, meaning that both have the typical passive endings outlined in 4.3.3.5. Discussion begins with the general forms, before proceeding to the third person plural forms and those of the imperfect subjunctive.

Table 115. Passive flexion of the a-subjunctive: general forms

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
beirid	‘carries’	BI	S1a	XVX-	b′ar-
dánaigidir	‘bestows’	AII	W2a	XVX-ig-	da∅n-əɣ′-
fo·crotha	‘shakes’	AI	W1	XVX-	·k˚r˚aθ-
do·beir	‘gives’	BI	S1a	XVX-	·b′ar-
comalnaithir	‘fulfils’	AI	W1	XVXVX	k˚aμla∅n-
		Absolute			
b′ar-əθ′ər′	→	b′arθər′	*berthair*		Ml37a8
		Relative			
ˈda∅n-ˌəɣ′-əθ′ər	→	ˈda∅ˌnəɣ′θ′ər	*dánaigther*		Ml40b2
		Conjunct			
·k˚r˚aθ-əθ′ər	→	·k˚r˚atər	*fo·crotar*		Ml129a10
·b′ar-əθ′ər	→	·b′arθar	*do-m·berthar*		Ml24d14
k˚aμla∅n-əθ′ər	→	·k˚aμalnəθ′ər	*ni·comollnither*		Wb2c17

The absolute ending of the general form is /-əθ′ər′/, while the ending for the absolute relative and for the conjunct is /-əθ′ər/. The examples above illustrate a number of the phonological phenomena outlined in section 3.3, which merit brief exposition here. In *dánaigther* (Ml40b2), the initial vowel of the ending is syncopated, as it is ephemeral

after the inherently unstressed formative /-əɣʹ-/ (see subsection 3.3.2.1). In contrast to this, the first vowel of the ending is not syncopated in the conjunct form *ni·comollnither*, as it is the third vowel of the word and thus unstressed rather than ephemeral. In the same form, the second vowel of the stem is syncopated while epenthesis breaks up the resulting illicit consonant cluster (see subsection 3.3.2.2). In the form fo·crotar the two homorganic fricatives which fall together after the syncope of the first vowel of the ending are resolved to the corresponding stop, as outlined in subsection 3.1.2.4. The next table lays out the third person plural forms of the passive flexion of the a-subjunctive.

Table 116. Passive flexion of the a-subjunctive: 3rd person plural forms

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
loscaid	'burns'	AI	W1	XVX-	L°ask-
marbaid	'kills'	AI	W1	XVX-	marβ-
séimigidir	'attenuates'	AII	W2a	XVX-ig-	sʹa∅ʹμʹ-əɣʹ-
caraid	'loves'	AI	W1	XVX-	kar-
roithid	'causes to run'	AII	W2b	XVX	R°aθʹ-
as·beir	'says'	BI	S1a	XVX-	·bʹar-
do·fortai	'pours out'	AI	W1	XVX-	φ°art-

Absolute				
L°ask-ədʹrʹ	→	L°askədʹərʹ	*loscaitir*	Ml24c5
marβ-ədʹrʹ	→	marβədʹərʹ	*marbitir*	Wb4a13
bʹa-ədʹərʹ	→	bʹadʹərʹ	*betir*	Ml54a17
Relative				
ˈsʹa∅ʹμʹ-ˌəɣʹ-ədər	→	ˈsʹa∅ʹˌμʹəɣʹ-dʹər	*semigter*	Ml54b15
kar-ədər	→	kardar	*cartar*	Ml78a2
R°aθʹ-ədr	→	R°aθʹadar	*rothetar*	Ml92a16
Conjunct				
·bʹar-ədər	→	·bʹardar	*as·bertar*	Sg10a8
·φ°art-ədr	→	·φ°artadar	*do·fortatar*	Ml124d12

As in the other stem formations, two different endings are found in the passive third person plural. The absolute ending is either /-ədʹərʹ/ or /-ədʹrʹ/, while for the conjunct both /-ədər/ and /-ədr/ are found. The passive forms of the imperfect a-subjunctive are shown in the table below.

Table 117. Passive flexion of the a-subjunctive: imperfect forms

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
do·berra	‘shears’	AI	W1	XVX-	b′aR-
fris·cuirethar	‘puts forward’	AII	W2	XVX-	k°ər′ → k°ar′-
as·beir	‘says’	BI	S1a	XVX-	·b′ar-
cumgaigidir	‘constricts’	AII	W2	XVXVX-ig-	k°əμ°əŋ°g°-əɣ′-
do·beir	‘gives’	BI	S1a	XVX-	·b′ar-

General				
·b′aR-əθ′a∅′	→	·b′aRθa∅′	*do·berrthe*	Wb11c12
·k°ar′-əθ′a∅′	→	·k°ar′θ′a∅′	*fris·coirthe*	Ml95a1
·b′ar-əθ′a∅′	→	·b′arθa∅′	*as·berthe*	Wb15d20
3rd person plural				
ˈc°aμ°əŋg°-ˌəɣ′-əd′əs′	→	ˈc°aμ°ˌg°əɣ′d′əs′	*no·cumgaigtis*	Ml87c5
b′ar-əd′əs′	→	b′ardəs′	*do·bertais*	Ml90a14

The endings of the passive of the imperfect a-subjunctive are the same as in the other stem formations: /-əθ′a∅′/ for the general form and /-əd′əs′/ for the third person plural form. There are a number of third person plural forms with an unexpected vowel before the ending, e.g. *for·brissitis* (Ml85d10) from *for·brissi* ‘breaks down’, *nu·badaitis* (Ml96c14) from *báidid* ‘drowns’.

This section has explored the flexion of the subjunctive in Old Irish, beginning with the s-subjunctive in 6.1.1, and proceeding to the a-subjunctive in 6.1.2. The following sections discuss further stem formations in Old Irish. The preterite formations are examined in 6.3, but the future is discussed first in 6.2, below.

6.2. The future stem

There are several distinct patterns of formation of the future stem. The first, termed the f-future, characterises all weak verbs, as well as a relatively small number of strong and hiatus verbs. Other future formations have their origins in reduplication. One, often just called the reduplicated future, but here termed the a-future, involves reduplication of an a-subjunctive stem. Another entails reduplication of an s-subjunctive stem and is hence termed the s-future. A final pattern, termed the ē-future, is productive in Old Irish and has spread from a few very common strong and hiatus verbs also to a number of weak verbs. Synchronically, it cannot be analysed as a reduplicated formation.

In a number of verbs, there is no distinct future stem, and the future is therefore identical to the subjunctive. Most of these cases are dealt with in the discussion of the various stem formations below.

The f-future is dealt with in 6.2.1, below. As both the a-future and the s-future have reduplication as the main feature of their stem formation, they are dealt with together in 6.2.2. The ē-future is the focus of subsection 6.2.3.

6.2.1. The flexion of the f-future

Perhaps no other formation in the Irish verbal system has engendered as much debate as the f-future (i.a. VGKii: 364; Watkins 1966; Quin 1978; McCone 1991; Matasović 2008). It occurs with nearly all the weak verbs in Old Irish and with hiatus verbs with roots beginning in u-colour,[348] as well as with some other verbs with XV- roots, such as *ad·cota* 'gets, obtains' and *ad·roilli* 'deserves'. It is also found with a number of strong verbs, including compounds based on the root *icc*-, such as *con·icc* 'is capable of', and those built on the root *em*-, such as *do·eim* 'covers, shelters' and *ar·eim* 'accepts, receives'. It is a productive formation already in the Old Irish period.

Synchronically, the major problem with modelling the f-future is the fact that while weak i-verbs retain their root-final i-colour in the future, the final of the future stem of weak a-verbs sometimes appears with a-colour and sometimes with i-colour. It is unclear to Thurneysen as to which of these is original (*GOI*: §637), while McCone (1987: 42) appears to consider i-colour the norm and a-colour to be an analogical development. For Watkins (1968: 66), on the other hand, it is the a-colour which is original for a-verbs and the i-colour sometimes found in the future of these verbs is due to spread from the i-verbs, although he notes that "the analogical mechanism is obscure". Given that this work is focused on the synchronic situation, it is not necessary to take a position on this matter, but it should be noted that the a-colour occurs with a-verbs already in quite early texts, so if it is due to analogical spread, that must have been operational already by the beginning of the Old Irish period.[349]

[348] The verb *foid* 'overnights' combines reduplication with the f-future.

[349] The failure of a similar reanalysis to occur in the s-preterite (see 6.3.1 below), which is also shared by weak verbs and hiatus verbs with initial u-colour, can perhaps be explained by the different flexional properties of the two formations. The vowel formative of the s-preterite is not syncopated nearly as often

The evidence points towards the formative of the f-future having a vowel before the characteristic <f> or <b> found throughout these formations.[350] For verbs with monosyllabic roots, as well as for the *-igidir* verbs, this vowel is regularly syncopated, as it falls in the syllable immediately after primary or secondary stress. For denominative and deadjectival verbs with disyllabic roots, it is rather maintained, as it does not fall in a position vulnerable to syncope.[351]

With respect to the colour of the /φ′/ of the formative, the evidence is not unequivocal. In the conditional third person plural form *nu·labraifitis* (Ml55a10), from *labraithir* 'speaks', it clearly has i-colour, whereas in *·labrafammar* (Wb12c4), a future first person plural form of the same verb, it clearly has a-colour. Synchronically, this type of variation can be largely predicted on the basis of the colour of the first consonant of the ending: i-colour and a-colour respectively in these examples.

In the case of the hiatus verbs that take an f-future, a long vowel or diphthong and an i-colour /-φ′-/ appears to be regular. The orthography is, as one might expect, consistent with a view of the long vowels and diphthongs in these verbs as resulting from the constellation of an original stem vowel and the /-∅′-/ of the f-future formative. The abstract consonant of the formative is not lost through syncope, as often occurs to vowels in hiatus (see 3.3.2.1). This has the happy consequence of generally bringing the vocalism of the f-future of hiatus verbs into line with the common active present third singular conjunct forms, facilitating also reinterpretation of the root of these verbs (see 5.1.4).

Given the somewhat contradictory facts with respect to the f-future, in what follows, I have represented this stem formation generally with the formative which best fits the data, i.e. /-∅′əφ′-/. For the i-verbs, it is immaterial which formative is written in any given case, so I have favoured the simpler variant /-əφ′/. In the case of the hiatus verbs, for which the f-future is likely not to be original, this formative would brings the

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as that of the f-future, and both the vowel and the distinctive /-s-/ of that formation disappear entirely in the third person singular conjunct. These facts reduce the contexts that might allow analogical levelling to occur.

[350] McCone (1987: 41) identifies it as *-if-*, while Thurneysen (*GOI*: §636) appears to suggest variation in the quality of the vowel.

[351] While it would be formally possible to consider the second vowel in forms such as future first person plural *·labrafammar* (Wb12c4) and *·samlafammar* (Wb17b12), from *labraithir* 'speaks' and *samlaithir* 'likens to', to result from epenthesis of an illicit cluster, on the basis of the roots *saml-* and *labr-* respectively, to do so runs counter to the assumptions made for the present tense conjugation of these verbs in this and other work devoted to the Old Irish verbal system, and anyway complicates the conjugation of the future.

vocalism of the future into line with that of the present third person singular conjunct, as stated above. In the case of the a-verbs, this formative induces i-colour in the final consonant of the stem. For the recalcitrant cases with rather a-colour in the final consonant of the stem, I see no alternative but to write instead simpler variant /-əφʹ/. This means that for a-verbs in the f-future there is free variation between the two formatives, i.e. /-∅ʹəφʹ-/ and /-əφʹ/.

In the following examples, I have attemtpted to give a broad, but largely representative sample of examples of the f-future. Subsection 6.2.1.1 examines active and deponent forms, while subsection 6.2.1.2 looks rather at the passive forms.

6.2.1.1. Active and deponent flexion of the f-future

This subsection discusses active and deponent flexion of the f-future. As usual, the examples are divided by person and number, although I have omitted entirely the second person plural, for which satisfactory examples cannot be found. The table below shows forms of the first person singular.

Table 118. 1st person singular flexion of the f-future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
anaid	'stays'	AI	W1	XVX-	∅an-
scairid	'separates'	AI	W1	XVX-	skar-
do·scéulai	'finds out'	AII	W2a	XVX-	sʹkʹa∅°lʹ-
do·aissilbi	'refers, ascribes'	AII	W2a	XVXVX-	∅asʹəlʹβʹ-

Absolute

∅an-∅ʹəφʹ-a∅	→	∅anʹφʹa∅	*ainfa*	Wb14a8

Conjunct

·skar-∅ʹəφʹ-∅°	→	·skarʹəφ°	*no·scairiub*	Ml43a23
·sʹkʹa∅°lʹ-əφʹ-∅°	→	·sʹkʹa∅°lʹəφ°	*du·sceulub*	Ml59a2
·∅asʹəlʹβʹ-∅ʹəφʹ-∅°	→	·asʹəlʹβʹəφ°	*do·naisilbub*[352]	Wb7a10

The person ending for the absolute first person singular is /-a∅/, while that of the conjunct is /-∅°/. As can be seen from the examples, *no·scairiub* (Ml43a23) has an i-

[352] The initial of the stem is nasalised here as it is relative.

colour stem-final consonant,[353] despite the fact that it is actually an a-verb, while *do·sceulub* (Ml59a2), which is also an a-verb, does not, but rather retains the u-colour of its root. The following table shows the forms of the second person singular.

Table 119. 2nd person singular flexion of the f-future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
íccaid	'pays, atones for'	AI	W1	XVX-	∅′ə∅′k-
soid	'turns'	AIII	H3	XV-	s°a-
anaid	'stays'	AI	W1	XVX-	∅an-
		Absolute			
∅′ə∅′k-∅′əφ′-a∅′	→	∅′ə∅′kφa∅′	*íccfe*		Wb10a9
		Conjunct			
·s°a-∅′əφ′-a∅′	→	·s°a∅′φ′a∅′	*no·soife*		Ml33a1
		Conditional			
·∅an-∅′əφ′-əθa∅	→	·∅an′φ′aθa∅	*no·ainfeda*		Wb27d20

In the second person singular, the ending is /-a∅′/ for both absolute and conjunct, while the conditional takes the secondary ending /-a∅/. The following table shows the forms of the third person singular.

Table 120. 3rd person singular flexion of the f-future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
sluindid	'signifies, expresses'	AII	W2b	XVX-	s°l°ən′d′-
íccaid	'pays, atones for'	AI	W1	XVX-	∅′ə∅′k-
méthaid	'fattens'	AI	W1	XVX-	m′a∅′θ-
creitid	'believes'	AII	W2a	XVX-	k′r′ad′-
fo·lína	'fills up'	AI	W1	XVX-	·L′ə∅′n-
con·osna	'ceases'	AI	W1	XVX-	·∅°əs°-an-
do·róscai	'stands forth'	AII	W2a	XVX-	·r°a∅°s°k°əx′-
línaid	'fills'	AI	W1	XVX-	L′ə∅′n-
		Absolute			
s°l°ən′ð′-∅′əφ′-əθ′	→	s°l°ən′ð′φ′əð′	*sluindfid*		Fél Pro 320
s°l°an′ð′-∅′əφ′-əθ′	→	s°l°an′ð′φ′əð′	*sloindfith*		Fél Pro 300
∅′ə∅′k-əφ′-əθ′	→	∅′ə∅′kφəθ′	*íccfaid*		Fél Ep 224
m′a∅′θ-əφ′-əθ′	→	m′a∅′θφəθ′	*methfaid*		CA §27
		Relative			
k′r′ad′-∅′əφ′-əs	→	k′r′ad′φ′as	*creitfes*		Wb4d5
		Conjunct			
·L′ə∅′n-∅′əφ′-a∅	→	·L′ə∅′n′φ′a∅	*fo·línfea*		Wb12d14

[353] Presuming the historical formative is **-*if*-, it follows that such a form must be analogical, as an unsycopated vowel had a weaker colouring effect than one which was lost through syncope.

·kəμ-əs˚-an-∅′əφ′-a∅	→	·kəμsanφə∅	*ní·cumsanfa*	Ml80d5
·R˚a-s˚k˚əx′-∅′əφ′-a∅	→	·R˚as˚k˚-əφ′a∅	*du·roscaifea*	Ml139b3
		Conditional		
·L′ə∅′n-∅′əφ′-əθ	→	·L′ə∅′n′φ′aθ	*no·línfed*	Wb25a8
·m˚al-əφ′-əθ	→	·m˚alφaθ	*nom·molfath*	Ml94a14

The absolute third person singular ending is the usual /-əθ′/. In the examples, *sluindfid* reflects the root vocalism, while *sloindfith* the lowered variant McCone associates with his W2b class of weak verbs (see 5.1.1 for discussion). The relative ending is /-əs/, while that of the conjunct is /-a∅/. The conditional has the secondary ending /-əθ/. The following table shows first person plural forms of the f-future.

Table 121. 1st person plural flexion of the f-future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
léicid	'lets go'	AII	W2a	XVX-	L′a∅′g′-
moídid	'boasts'	AII	W2a	XVX-	m˚a∅′d′-
íccaid	'pays, atones for'	AI	W1	XVX-	∅′ə∅′k-
bruid	'smashes'	AIII	H3	XV-	b˚r˚ə-
ad·tluichethar	'believes'	AII	W2a	XVX-	·t˚l˚əx˚-
con·delga	'compares'	AI	W1	XVX-	·d′alg-
		Absolute			
L′a∅′g′-∅′əφ′-əm′ə∅′	→	L′a∅′g′φ′əm′ə∅′	*léicfimmi*		Ml14d10
		Relative			
L′a∅′g′-∅′əφ′-əm′a∅′	→	L′a∅′g′φ′əm′a∅′	*léicfimme*		Ml14d8
		Conjunct			
·m˚a∅′d-∅′əφ′-əμ	→	·m˚a∅′d′φ′aμ	*ní-n·móidfem*[354]		Wb17b10
·b˚r˚ə-∅′əφ′-əμ	→	·b˚r˚ə∅′φ′aμ	*ní·brúifem*		Fél Pro 304
·t˚l˚əx˚-əφ′-əμ	→	·t˚l˚əx˚φ˚aμ	*ad·tluchfam*		Wb17a2
		Conditional			
·∅′ə∅′k-∅′əφ′-əm′əs′	→	·∅′ə∅′k′φ′əm′əs′	*con·icfimmis*		Wb17a10

The first person plural conjunct ending is the usual /-əμ/, while the absolute ending is /-əm′ə∅′/, the relative /-əm′a∅′/, and the conditional /-əm′əs′/. The forms given here are good evidence for the disyllabic character of these endings. The formative of the f-future is regularly syncopated, meaning that the first syllable of the ending falls in the third syllable, where it is not vulnerable to syncope, being unstressed rather than ephemeral (see 3.3.2.1). The following table shows forms of the third person plural.

[354] With first person plural infix pronoun /-n/.

Table 122. 3rd person plural flexion of the f-future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
gíallaid	‘gives hostages’	AI	W1	XVX-	g′a∅L-
molaid	‘praises’	AI	W1	XVX-	m°al-
sléchtaid	‘prostrates’	AI	W1	XVX-	s′l′a∅′xt-
creitid	‘believes’	AII	W2a	XVX-	k′r′ad′-
dechraigidir	‘is scattered’	AII	W2	XVXVX-ig	d′ax°ər-əɣ′-
do·lega	‘destroys, abolishes’	AI	W1	XVX-	·L′ag-
		Absolute			
g′a∅L-∅′əφ′-əd′	→	g′a∅L′φ′əd′	*géillfit*		Wb41d13
m°al-əφ′-əd′	→	m°al-əφ′a-əd′	*molfait*		Ml69b1
s′l′a∅′xt-əφ′-əd′	→	s′l′a∅′xtφəd′	*slechtfait*		Ml89d14
		Relative			
k′r′ad′-əφ′-əd′a∅′	→	k′r′ad′φ′əd′a∅′	*creitfite*		Wb5c12
		Conjunct			
·d′ax°ər-əɣ′-əφ′-əd	→	·d′ax°r°əɣ′φ′ad	*ní·dechraigfet*		Ml90b6
		Conditional			
·L′aɣ-∅′əφ′-əd′əs′	→	·L′ax′φ′əd′əs′	*dus·leichfitis*		Ml84c20
·Laβar-əφ′-əd′əs′	→	·Laβrəφ′ad′əs′	*nu·labraifitis*		Ml55a10

In the third person plural, the absolute ending is /-əd′/, while that of the conjunct is /-əd/. The absolute relative has the ending /-əd′a∅′/, without syncope with monosyllabic roots as the vowel of the formative is syncopated instead. The ending for the conditional is /-əd′əs′/. It should be noted that the form *nu·labraifitis*, above, shows unexpected retention of the first vowel of the person ending. One would expect this to be syncopated, falling as it does in an even, non-final syllable.

This concludes the discussion of the active and deponent flexion of the f-future, while the following subsection examines the passive forms.

6.2.1.2. Passive flexion of the f-future

This section examines the passive forms of the f-future, beginning with the general forms in the table below, then moving on to the third person plural forms and then the passive of the f-conditional

Table 123. Passive flexion of the f-future: general forms

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
íccaid	‘pays, atones for’	AI	W1	XVX-	∅′ə∅′k-
soíraid	‘frees, liberates’	AI	W1	XVX-	s°a∅′r-
línaid	‘fills’	AI	W1	XVX-	L′ə∅′n-
pridchaid	‘preaches’	AI	W1	XVXVX-	p′r′əð°əx-
creitid	‘believes’	AII	W2a	XVX-	k′r′ad′-
		Absolute			
∅′ə∅′k-∅′əφ′-əθ′ər′	→	∅′ə∅′k′φ′əθ′ər′	*íccfidir*		Wb25a3
s°a∅′r-∅′əφ′-əθ′ər′	→	s°a∅′r′φ′əθ′ər′	*soirfithir*		Ml68d14
		Relative			
L′ə∅′n-∅′əφ′-əθ′ər	→	L′ə∅′n′φ′əð′ar	*linfider*		Ml103a10
p′r′əð°əx-əφ-əθ′ər	→	p′r′əð°x°əφθər	*pridchabthar*		Wb26b6
		Conjunct			
·∅′ə∅′k-∅′əφ′-əθ′ər′	→	·∅′ə∅′k′φ′əθ′ər	*in·ícfider*		Ml96b11
·L′ə∅′n-∅′əφ′-əθ′ər	→	·L′ə∅′n′φ′əð′ar	*nom·línfider*		Ml33b11
·k′r′ad′-əφ′-əθ′ər	→	·k′r′ad′-əφ′əd′ər	*nad·creidfider*		Wb28c14

The passive general ending is /-əθ′ər/, while that of the relative and conjunct is /-əθ′ər/. The relative form *pridchabthar* (Wb26b6), like the first person plural form *labrafammar* (Wb12c14) discussed in the introduction to this subsection, seems to have an a-colour rather than an i-colour /φ/. The following table shows the third person plural forms.

Table 124. Passive flexion of the f-future: 3rd person plural forms

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
íccaid	‘pays, atones for’	AI	W1	XVX-	∅′ə∅′k-
roithid	‘causes to run’	AII	W2b	XVX-	R°aθ′-
comalnaithir	‘fulfils	AI	W1	XVXVX-	k°aμla∅n-
do·gaítha	‘deceives’	AI	W1	XVX-	·ga∅′θ-
		Absolute			
R°aθ′-əφ′-əd′ər′	→	R°a∅′φ′əd′ər′	*roithfiter*		Ml15c18
∅′ə∅′k-əφ′-əd′ər′	→	∅′ə∅′kφəd′ər′	*ícfaitir*		Sg54a1
		Conjunct			
·k°aμla∅n-əφ′-əd′ər	→	·k°aμaLəφ′d′ər	*ar·chomallaibtir*		Ml109c9
·ga∅′θ-∅′əφ′-əd′ər	→	·ga∅′θ′φ′əd′ar	*do·gaithfiter*		Ml54a26

The third person plural passive forms of the f-future have the usual endings of /-əd′ər′/ for the absolute and /-əd′ər/ for the conjunct. The example *ar·chomallaibtir* (Ml109c9) above, has unexpected <i> rather than <e> in the final syllable.

Table 125. Passive flexion of the f-conditional

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
comalnaithir	'fulfils	AI	W1	XVXVX-	k˚aμla∅n-
soíraid	'frees, liberates'	AI	W1	XVX-	s˚a∅′r-
for·cenna	'puts an end to'	AI	W1	XVX-	·k′əN-
		General			
·k˚aμla∅n-əφ′-əθ′a∅′	→	·k˚aμaLəφ′θ′a∅′	*no·comallaibthe*		Ml105b14
		3rd person plural			
·s˚a∅′r-∅′əφ′-əd′əs′	→	·s˚a∅′ɾ′φ′əd′əs′	*no·soirfitis*		Ml91a10
·k′əN-∅′əφ′-əd′əs′	→	·k′aN′φ′əd′əs′	*for·ceinnfitis*		Sg6a6

The conditional passive forms have the usual endings /-əθ′a∅′/ for the general form and /-əd′əs′/ for the third person plural. These forms show the expected vocalism and are good evidence for these endings being analysed as disyllabic.

This concludes the discussion of the f-future. The next subsection examines the reduplicated s-future and the reduplicated a-future.

6.2.2. The flexion of the reduplicated s-future and a-future

The reduplicated future stems involve reduplication of the subjunctive stem. In this respect, two distinct formations can be identified: an an s-future whose reduplication is based on the s-subjunctive stem and an a-future resulting from reduplication of the a-subjunctive stem. The endings of the s-future are, for the most part, the same as those of the s-subjunctive, while those of the a-future are generally the same as those of the a-subjunctive.

Future reduplication involves reduplication of the first consonant of the subjunctive stem, with the reduplicant having i-colour and being followed by /ə/. This reduplicating syllable causes lenition of a following consonant. Thus, given a subjunctive stem of the form /$X^{x}{}_{1}VX_{2}$-/, that of the reduplicated future is /$X'_{1}ə^{L}$-$X_{1}əX_{2}$-/. As the low vowel of the subjunctive is always in unstressed position in these reduplicated futures, it is rather neutralised to /ə/ in the future.[355]

[355] There are isolated examples in which the vowel of the future appears to be /a/ rather than /ə/, e.g. absolute third person singular *seiss* (Wb26a8), from *saidid* 'sits', or in which the vowel appears short where a long vowel might be expected, e.g. absolute first person singular *fessa* (LU10921) and third person singular *feis* (LU7186) from *fichid* 'fights'.

Reduplicated forms, both in the future and in the preterite (see 6.3.4), show a number of particularities. For verbs whose roots begin in /sC-/, the /s/ is lost entirely under reduplication, e.g. future third person singular *silis* (IB 55) from *sligid* 'fells', and *selais* (TBC^{2}3458) from *slaidid* 'strikes down, plunders'. In those cases in which the initial /s/ of the root goes back to **sw* the result of reduplication is /-φ-/, e.g. third person singular *siofais* (Gwynn 1942: 40.5) from *seinnid* 'plays (instrument)'.

Furthermore, in a number of verbs reduplication is not found even when the root is stressed. These are *aingid* 'protects', *laigid* 'lies', *saidid* 'sits, *reithid* 'runs, *teichid* 'flees', and verbs built on the root *reg*-, such as *at·reig* 'rises'. In all these cases the future stem thus falls together with that of the subjunctive (*GOI*: §661-2).

The verbs *ernaid* 'grants, bestows' and *airid* 'ploughs' have the future stem *ebr*-, while *aigid* 'drives' and *aingid* 'protects' have the stem *ebl*-. This goes back to a reduplicated formation in the case of *ernaid*. The other three verbs are the only strong verbs with roots beginning with /∅-/, meaning that this formation is predictable on the basis of root shape for these verbs. One weak verb, *caraid* 'loves', also takes a reduplicated future, presumably on the model of *canaid* 'sings' (*GOI*: §648).

When *·fo*- and *·ro*- come under the stress in reduplicated formations, the initial of the stem is reduced to /∅′/, e.g. for the future of *fo·ceird* 'puts', the first person singular deuterotonic form is *fo·cichiurr* (TBC^{2}1290 and below), while the prototonic form is rather *·foíchiurr* (Ml78c8).

As in the preterite, the reduplicated future of *benaid* 'strikes', as well as forms built on the root *fen*-, such as *for·fen* 'finishes', show exceptional reduction of their root-initial labial to /∅/. This also occurs with the two deponent verbs with initial labials which take an s-future, i.e. *ro·finnadar* 'gets to know', and *midithir* 'judges', with future stems /φ′a∅əs-/ and /m′a∅əs-/ respectively.

For verbs with roots beginning in a cluster of obstruent and sonorant, the obstruent is often reduced to /∅°/, e.g. future third person plural *gíulait*, from *glenaid* 'sticks'. This is not universal however, as a number of verbs with an s-future (*GOI*: §658), and some with an a-future, e.g. third person singular *rot·chechladar* (Wb28d16) from *ro·cluinethar* 'hears', tend rather to retain a lenited obstruent in this position. The

orthography of the second person singular form *ar·ciuchlais*, from *ar·clich* 'wards off', may point to confusion between the two types.[356]

In a-future formations built on XV- roots, reduplication in the future often treats the subjunctive stem as though it were composed of a simple consonant. The evidence for this comes from forms such as first person plural relative *cichme* (LL13833), from *ciid* 'weeps', third person plural relative *bebte* (Wb25b16), from *baid* 'dies', and passive general form *as·rirther* (Wb1c3), from *as·ren* 'pays out, expends. As these forms have disyllabic endings, one would expect retention of the vowel if the future stem had the shape XVXV-, so it is reasonable to instead posit an XVX- future stem, as occurs also in the reduplicated preterite discussed in 6.3.4.[357] However, this does not appear to be the case in all formations, and the abstract consonant endings are most easily modelled on the basis of an XVXV- future stem.

The following subsections present the flexion of the reduplicated future. The active and deponent flexion is explored in 6.2.2.1 and the passive in 6.2.2.2.

6.2.2.1. Active and deponent flexion of the reduplicated s-future and a-future

This subsection discusses the active and deponent flexion of the reduplicated future, beginning with the first person singular forms, laid out in the table below.

Table 126. 1st person singular flexion of the reduplicated future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
saigid	'approaches, seeks'	BI	S1a	XVX-	saØs- → s′ə^{L}-səØs-
guidid	'prays, asks'	BII	S2	XVX-	g′as- → g′ə^{L}-g′əs-
do·fich[358]	'vanquishes'	BI	S1a	XVX-	·φ′as- → ·φ′ə^{L}-φ′əs-
fo·loing	'supports'	BIII	S1d	XVX-	·L°aØ°s- → ·L′ə^{L}-L°əØ°s-
fris·oirc	'offends'	BI	S1c	XVX-	·Ø°aR- → ·Ø′ə^{L}-Ø°əR-
do·fúairc	'grinds'	BI	S1c	XVX-	φ°əØ°aR- → ·φ′ə^{L}-φ°əØ°əR-
fo·ceird	'throws'	BI	S1a	XVX-	·k′aR- → ·k′ə^{L}-k′əR-
as·ren	'pays out, expends'	BIV	S3	XV-	·R′a- → ·R′ə^{L}-R′ə-

[356] The two formations are occasionally found side by side in the preterite as well, as can be seen by contrasting the third person singular forms of glenaid 'sticks' *ro·gíul* (Ml98b8) and *ro·giguil* (Rawl 84b55).

[357] There are exceptions to this generalisation, discussed when they occur in the exposition below.

[358] From *to-fich-*, in contrast to the example under the third person singular, which comes from *di-fich-* (VGKii: 521). The two are listed separately in DIL with slightly different meanings (DIL 17637 and DIL 17638).

for·cain	‘teaches’		BI	S1c	XVX-	·kan- → ·k′ə^{L}-kən-
midithir	‘judges’		BII	S2	XVX-	m′as- → m′a∅əs-
ro·finnadar	‘gets to know’		BV	S3	XVX-	φ′as- → ·φ′a∅əs-
			Absolute			
s′ə^{L}-sə∅s-a∅		→	s′asa∅		*sesa*	Bürg 13 §44
g′ə^{L}-g′əs-a∅		→	g′əɣ′s′a∅′		*gigse*	Ml47d4-5
			Conjunct			
·φ′ə^{L}-φ′əs-∅°		→	·φ′ə∅′əs°		*don-da·fius*[359]	Ml126c19
·L′ə^{L}-L°ə∅°s-∅°		→	·L′əl°əs°		*fo·lilus*	Wb23b25
·g′ə^{L}-g′əs-∅°		→	·g′əɣ′əs°		*no·gigius*	Ml46b12
·∅′ə^{L}-∅°əR-∅°		→	·∅′ə∅°əR°		*friss·iurr*	Ml37c12
·φ′ə^{L}-φ°ə∅°əR-∅°		→	·φ′ə∅°əR°		*do·fiurr*	Ml113a11
·k′ə^{L}-k′əR-∅°		→	·k′əx′əR°		*fo·cichiur*	TBC^{2} 1290
·R′ə^{L}-R′ə-∅°		→	·R′ər′ə∅°		*as·ririu*	Wb18a14
·k′ə^{L}-kən-		→	·kexan		*for·cechan*	Ml53c14
			Deponent conjunct			
φ′ə∅əs-ər°		→	φ′as°ər°		*ro·fessur*	Wb9a21
m′ə∅əs-ər°		→	m′as°ər°		*nu·mmessur*	Ml94b8
			Conditional			
·L′ə-l°ə∅°s-əN′		→	·L′əl°s°əN′		*fo·lilsain*	Ml73d1

The absolute first person singular ending of the s-future appears to be /-a∅/, as in the a-subjunctive. I have been unable to uncover any examples of the absolute first person singular of the a-future, but one could imagine that the same ending would be used there. In the conjunct, however, the two formations differ: the s-future takes the ending /-∅°/, while the endings of the a-future can be considered to be the same as the a-subjunctive, i.e. /-∅°/ after a vowel and a zero ending after a consonant, assuming an XVXV- future stem for the relevant verbs in this instance.

The entirely regular treatment of the vowel-initial roots under reduplication, e.g. *fris·iurr* above, is a considerable achievement of the phonological model adopted here. In the traditional or binary systems, these had to be dealt with as separate formations, or as anomalies (e.g. *GOI*: §665; McCone 1987: 45f.). The ending of the first person singular deponent is /-ər°/.

[359] With third person plural infix pronoun /-da^{G}/.

Table 127. 2nd person singular flexion of the reduplicated future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
cingid	‘steps’	BI	S1a	XVX-	k′a∅s- → k′ə^{L}-k′ə∅s-
lenaid	‘remains, attaches to’	BIV	S3	XVX-	L′a- → L′ə^{L}-L′-
con·rig	‘binds together’	BI	S1a	XVX-	·R′as- → ·R′ə^{L}-R′əs-
orcaid	‘kills, slays’	BI	S1c	XVX-	∅°aR- → ∅′ə^{L}-∅°əR-
for·cain	‘teaches’	BI	S1c	XVX-	·kan- → ·k′ə^{L}-kən-

Absolute				
k′ə^{L}-k′ə∅s-ə∅′	→	k′əx′s′ə∅′	*cichsi*	YBL173b51
L′ə^{L}-L′-a∅′	→	L′əl′a∅′	*lile*[360]	Fél Pro.309

Conjunct				
·R′ə^{L}-R′əs-∅′	→	·R′ər′as′	*con·riris*	Ml134d3
·∅′ə^{L}-∅°əR-∅′	→	·∅′ə∅°əR′	*ní·írr*	Ml77a10
·k′ə^{L}-kən-a∅′	→	·kexna∅′	*for·cechnae*	Ml114b11

The evidence for the second person absolute is not extensive, but points towards the ending /-ə∅′/ for the s-future and /-a∅′/ for the a-future, as in the corresponding subjunctive formations. The conjunct ending is /-∅′/ for the s-future, and, as in the absolute, /-a∅′/ for the a-future, again in line with the endings of the s-subjunctive and a-subjunctive. In this case, it makes no difference whether a verb such as *lenaid* is modelled as having an XVX- or XVXV- future stem.

For the forms *orcaid* ‘kills, slays’ given above, it is worth noting that for the future second person singular the spelling *·írr* occurs three times in the Milan glosses (Ml77a10; Ml77a13; Ml77a15), while *inda·hierr* (Ml77a16) occurs once. Also relevant in this regard is *do·furr* (leg. *do·fiir*?) from *do·fúairc* ‘grinds’. I presume hiatus in these cases, as in the first and third persons singular, in spite of the variable orthography of a somewhat rare constellation.

Table 128. 3rd person singular flexion of the reduplicated future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
saigid	‘approaches, seeks’	BI	S1a	XVX-	sa∅s- → s′ə^{L}-sə∅s-
maidid	‘breaks, bursts’	BII	S2	XVX-	ma∅s → m′ə^{L}-mə∅s-
ithid	‘eats’	BI	S1a	XVX-	∅′as- → ∅′ə^{L}-∅′əs-
guidid	‘prays, asks’	BII	S2	XVX-	g′as- → g′ə^{L}-g′əs-
orcaid	‘kills, slays’	BI	S1c	XVX-	∅°aR- → ∅′ə^{L}-∅°əR-

[360] This form is listed in DIL as *lile* and similarly by Thurneysen (*GOI*: §653), who notes that Stokes amended it to *lili*. The form *lile* is paradigmatically justified if the subjunctive endings are assumed. The alternative would be to consider the absolute endings of the second person singular to be identical in the s-future and a-future (*GOI*: §655).

ad·fét	‘tells, relates’	BI	S1b	XVX-	·φ′a∅s- → ·φ′ə^{L}-φ′ə∅s-[361]
do·fich	‘punishes, avenges’	BI	S1a	XVX-	·φ′as- → ·φ′ə^{L}-φ′əs-
ar·slig	‘smites’	BI	S1a	XVX-	s′l′as- → s′ə^{L}-s′l′əs-
fris·oirc	‘offends’	BI	S1c	XVX-	·∅°aR- → ·∅′ə^{L}-∅°əR-
fo·ceird	‘throws’	BI	S1a	XVX-	·k′aR- → ·k′ə^{L}-k′əR-
as·ren	‘pays out, expends’	BIV	S3	XV-	·R′a- → ·R′ə^{L}-R′ə-
do·lin	‘flows’	BV	S3	XV-	L′a- → ·L′ə^{L}-L′ə-
saidid	‘sits’	BI	S1a	XVX-	s′as- → s′ə^{L}-s′əs-
gainithir	‘is born’	BII	S2	XVX-	g′an- → g′ə^{L}-g′ən-
midithir	‘judges’	BII	S2	XVX-	m′as- → m′a∅əs-
ro·finnadar	‘gets to know’	BV	S3	XVX-	φ′as- → ·φ′a∅əs-

Absolute				
s′ə^{L}-sə∅s-∅′	→	s′ahəs′	*siais*	ZCP 9[362]
m′ə^{L}-mə∅s-∅′	→	m′aμəs′	*memais*	Trip 138.7
∅′ə^{L}-∅′əs-əθ′	→	∅′ə∅′səθ′	*ísaid*	SG 56.41
Relative				
g′ə^{L}-g′əs-∅	→	g′əɣ′as	*giges*	Ml53c3
∅′ə^{L}-∅°əR-əs	→	∅′ə∅°Ras	*íuras*	LU7137
Conjunct				
s′ə^{L}-sə(∅s)-	→	s′aha∅	*na-da·sia*[363]	CA §31
m′ə^{L}-mə(∅s)-	→	m′əμa∅	*ní·mema*	Ml89c11
·φ′ə^{L}-φ′ə(∅s)-	→	·φ′ə∅′ə∅′	*ad·fíi*	IB §52
·φ′ə^{L}-φ′(əs)-	→	·φ′ə∅′	*du·fí*	Wb67c5
·s′ə^{L}-s′l′(əs)-	→	·s′əl′	*ar·sil*	Fél Sep.29
·∅′ə-∅°əR-	→	·∅′ə∅°aR	*frit-tamm·ior*[364]	Ml32d27[365]
·k′ə^{L}-k′əR-	→	·k′əx′aR	*fo·cicherr*	Ml87d6
·R′ə^{L}-R′ə-	→	·R′ər′ə∅′	*as·riri*	Wb25b6
·L′ə^{L}-L′ə-	→	·L′əl′ə∅′	*do·lili*	Ml30c13
Deponent relative				
m′ə∅əs-tr	→	m′a∅astar	*míastar*	Wb1d9
Deponent conjunct				
·m′ə∅əs-tr	→	·m′a∅astar	*con·miastar*	Ériu 1[366]
·φ′ə∅əs-tr	→	·φ′a∅astar	*ni·fiastar*	Wb12d18
Conditional				
·g′ə^{L}-g′ən-əθ	→	·g′əɣ′n′aθ	*no·gigned*	Sg138b1

[361] This verb is inconsistent between a long and short vowel in its subjunctive stem, but the rather slim evidence suggests that the future is built on the expected long vowel. Short vowels in the subjunctive might be due to analogical pressure from the forms of *ro·finnadar* ‘gets to know’ (see 7.1.1, above).

[362] Meyer (1913: 455.24).

[363] With third person plural infix pronoun /-da^{G}/.

[364] With first person singular infix pronoun /-dam^{L}/.

[365] Also occurring once in the same corpus as *fritat·n-íarr* (Ml93a5).

[366] Strachan (1904: 195.6).

The ending for the third person singular absolute is typically /-∅′/ for the s-future, while I am not aware of any examples for the a-future. The use of /-əθ′/ in the example *ísaid*, from *ithid* ‘eats’, above, is a later form. For the relative, the ending is /-əs/, or rather /-∅/ after /s/, as in most forms of the s-future.

In the conjunct, the s-future is conjugated like the s-subjunctive, i.e. the formative /-s-/ is deleted alongside the preceding specification, meaning that the presence of a long or short vowel in the subjunctive stem predicts the presence or absence of a vowel in the future third person singular conjunct, although there is a certain amount of confusion and levelling already in the Old Irish period.

For the a-future, as well as those s-future forms ending in a fortis sonorant, there is no ending in the third person singular conjunct and the resulting forms are identical to the stem. In this case, it the derivation is considerably more straightforward if hiatus verbs are considered to have XVXV- stems in the future.

Problematic are forms built on the verbs *daimid* ‘suffers, endures’ and its compound *fo·daim* ‘suffers, endures’, e.g. *fo·ndidmae* (Ml35c33), reduplicated future of *fo·daim*. This implies a stem based on initial u-colour, i.e. /d′ə^{L}-d°əμ/ without parallel elsewhere in the verbal system.[367]

The imperfect third person singular has the usual ending /-əθ/, while the deponent formations shown here are s-futures and accordingly have the ending /-tr/ for both relative and conjunct. The following table shows the first person plural forms.

Table 129. 1st person plural flexion of the reduplicated future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
cingid	‘steps’	BI	S1a	XVX-	k′a∅s- → k′ə^{L}-k′ə∅s-
ciid	‘weeps’	AIII	H2	XV-	k′a- → k′ə^{L}-k′-
ibid	‘drinks’	BI	S1a	XVX-	∅′aβ- → ∅′ə^{L}-∅′əβ-
midithir	‘judges’	BII	S2	XVX-	m′as- → m′a∅əs-

Absolute				
k′ə^{L}-k′əs-əm′ə∅′	→	k′əx′s′əm′ə∅′	*cichsimi*	ZCP12[368]
Relative				
k′ə^{L}-k′-əma∅′	→	k′əx′ə-ma∅′	*cichme*	LL13833
Conjunct				
·∅′ə^{L}-∅′əβ-əμ	→	·∅′ə∅′βaμ	*in·n-íbham*	BNnÉ 63.34

[367] That this is not just an exceptional form is confirmed by examples from elsewhere in the paradigm, e.g. third person plural *fos·didmat* (Ml15c10). Possibly parallel is *ní·lilmatar* (Ml69b3), from *ro·laimethar* ‘dares’ although this there is some controversy over this form (see *GOI*: §647).
[368] Thurneysen (1918: 404.10).

Deponent absolute				
m′a∅əs-əm′r′	→	m′asəm′ər′	*messimmir*	Wb9c10
Deponent conjunct				
m′ə∅əs-əmr	→	m′asamar	*no-s·messammar*	Wb9c10

The first person plural endings are /-əmə∅′/ for the absolute, /-əma∅′/ for the relative, and /-əμ/ for the conjunct. I was not able to uncover any imperfect forms. The form *cichme*, although admittedly late, is easiest to model on the basis of an XVX- future stem. The first person plural deponent endings are /-əm′r′/ for the absolute and /-əmr/ for the conjunct. The following table shows the second person plural forms of the reduplicated future.

Table 130. 2nd person plural flexion of the reduplicated future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
guidid	'prays, asks'	BII	S2	XVX-	g′as- → g′ə^{L}-g′əs-
saigid	'approaches, seeks'	BI	S1a	XVX-	sa∅s- → s′ə^{L}-sə∅s-
ro·finnadar	'gets to know'	BV	S3	XVX-	φ′as- → ·φ′a∅əs-
Absolute					
g′ə^{L}-g′əs-t′a∅′	→	g′əg′asta∅′		*gigeste*	Wb14c2
Conjunct					
s′ə^{L}-sa∅s-əθ′	→	s′əsəθ′		*ro·sesaid*	LU1850
·φ′ə∅əs-əð′	→	·φ′asəð′		*ro·fessid*	Wb7d6

For the second person plural, the absolute ending is /-t′a∅′/, although in the example given here one might expect syncope of the medial vowel, which does not occur. The conjunct ending is /-əθ′/, the same for verbs which take both active and deponent flexion, as the examples show. I have not come across any instances of the imperfect. The following table shows the third person plural forms of the reduplicated future.

Table 131. 3rd person plural flexion of the reduplicated future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
ligid	'licks'	BII	S2	XVX-	L′as-[369] → L′ə^{L}-L′əs-
ibid	'drinks'	BI	S1a	XVX-	∅′aβ- → ∅′ə^{L}-∅′əβ-
glenaid	'sticks'	BIV	S3	XV-	g′l′a- → g′ə^{L}-g′l′-
fo·loing	'supports'	BIII	S1d	XVX-	·L°a∅°s- → ·L′ə^{L}-L°ə∅°s-
baid	'dies'	AIII	H1	XV-	ba- → b′ə^{L}-ba-
ara·chrin	'decays, fails'	BV	S3	XV-	·x′r′a- → ·x′ə^{L}-x′r′ə-
fris·oirc	'offends'	BI	S1c	XVX-	·∅°aR- → ·∅′ə^{L}-∅°əR-

[369] To the best of my knowledge, the subjunctive is unattested, but can be safely inferred.

ro·finnadar	‘gets to know’	BV	S3	XVX-	φ′as- → ·φ′a∅əs-
ad·cí	‘sees’	AIII	S2	XVX-	·k′a- → ·k′ə^{L}-k′ə-

Absolute				
∅′ə^{L}-∅′əβ-əd′	→	∅′ə∅′βəd′	*ibait*	Ml30c18
L′ə^{L}-L′əs-əd′	→	L′əl′s′əd′	*lilsit*	Ml89d14
g′ə^{L}-g′l′-əd′	→	g′ə∅°ləd′	*gíulait*	Ml65b7
Relative				
b′ə^{L}-b-əd′a∅′	→	b′aβda∅′	*bebte*	Wb25b16
Conjunct				
·L′ə^{L}-L°ə∅°s-əd	→	·L′əl°s°ad	*fo·lilsat*	Wb25d15
·x′ə^{L}-x′r′-əd	→	·x′ə∅°rad	*ara·chiurat*	Ml59b5
·∅′ə^{L}-∅°aR-əd	→	·∅′ə∅°Rad	*frit-tamm·iurat*	Ml33a1
Deponent conjunct				
·φ′ə∅əs-ədr	→	·φ′asadar	*ro·fessatar*	Ml69b1
Conditional				
·k′ə^{L}-k′ə-əd′əs′	→	·k′əx′əd′əs′	*ad·cichitis*	Wb7a2

The ending of the absolute third person plural is /-əd′/, while that of the conjunct is, as usual, /-əd/, with the deponent conjunct having the ending /-ədr/. The absolute relative ending is /-əd′a∅′/ and the conditional ending /-əd′əs′/. The forms *gíulait* and *ara·chiurat* can be modelled equally well with either an XVX- or XVXV- future stem, but the occurrence of syncope in *bebte* requires an XVX- stem, while its failure *ad·cichitis* is difficult to explain unless one assumes an XVXV- stem instead.

This concludes the discussion of the active and deponent flexion of the reduplicated future. Subsection 6.2.2.2, below, shows the passive forms.

6.2.2.2. Passive flexion of the reduplicated s-future and a-future

The passive of the reduplicated future formations is not extensively attested. The following table shows a selection of the forms which occur.

Table 132. Passive flexion of the reduplicated future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
midithir	‘judges’	BII	S2	XVX-	m′as- → m′a∅əs-
renaid	‘sells’	BIV	S3	XV-	R′a- → R′ə^{L}-R′-
con·rig	‘binds together’	BI	S1a	XVX-	·R′as- → ·R′ə^{L}-R′əs-
do·fich	‘punishes, avenges’	BI	S1a	XVX-	·φ′as- → ·φ′ə^{L}-φ′əs-
fo·loing	‘supports’	BIII	S1d	XVX-	·L°a∅°s- → ·L′ə^{L}-L°ə∅°s-

General absolute				
m′a∅əs-t′r′	→	m′a∅astər′	*miastair*	Sg30d25
General conjunct				
·R′ə^{L}-R′-əθər	→	R′ər′θ′ar	*as·rirther*	Wb1c3
·φ′a∅əs-tr	→	·φ′a∅əstar	*du·fiastar*	Ml27c4
·R′ə^{L}-R′əs-tr	→	R′ər′əstar	*co-tan·riristar*	Ml134a1
·L′ə^{L}-L˚ə∅˚s-tr	→	·L′əl˚əstar	*fu·lilastar*	Ml109b2
3rd person plural conjunct				
·φ′ə^{L}-φ′əs-ədər	→	φ′asadar	*du·fesatar*	Ml24b19

The absolute general form here is from the s-future and thus exhibits the sigmatic ending /-t′r′/. For the conjunct, the usual ending /-əθər/ is found in the a-future, while the sigmatic ending /-tr/ is used in the s-future. The usual third person plural conjunct ending /-ədər/ is found here.

This concludes the discussion of the reduplicated future forms in Old Irish. The following subsection examines the final future formation under discussion in this section, the ē-future.

6.2.3. The flexion of the ē-future

The ē-future has its origin in reduplication (Pokorny 1913: 90), but it is a productive pattern in Old Irish and cannot be modelled as a reduplicated formation synchronically. The stem vowel of all ē-future verbs is <é>, never alternating with <ía>, and is formally represented in this work as /a∅˚/ after an i-colour consonant. The evidence for a u-colour rather than i-colour abstract consonant comes from the future development of this in the later language. One should also note that u-colour reflexes of consonants lenited under reduplication are common elsewhere, such as in some of the forms of the reduplicated future formations discussed in 6.2.2, above, and in the preterite ones explored in 6.3.4, below.

The ē-future can be considered to have the stem template /X′a∅˚X-/, with i-colour for the initial segment of the stem, a-colour for the final segment of the stem and /-a∅˚-/ in between.[370] The only hiatus verbs which take this formation are *gniid* and its

[370] In terms of its strict templatic nature, and possible also in those of its historical development, it bears much in common with the ā-preterite, explored in section 6.3.3, below.

compounds. As these verbs have an XV- root shape, i.e. /gʹnʹə-/, the template is enforced by breaking up the initial cluster, yielding the future stem /gʹa∅°n-/.[371] The one exception to these generalisations is the substantive verb, which is best modelled by considering it to have the future stem /bʹa∅/.

One cannot predict which verbs take an ē-future by any phonological criteria. However, this includes a number of very frequent verbs, including *beirid* 'carries' and its compounds, especially *as·beir* 'says' and *do·beir* 'gives'; *gaibid* 'takes' and its compounds; *gairid* 'calls' and its compounds; *gniid* 'does, makes' and its compounds, including the very frequent verb *do·gní* 'does, makes'. To these may be added several strong verbs which, like *beirid* and its compounds, take the alternating pattern in the present, such as *meilid* 'grinds' and *ceilid* 'hides' (see subsection 5.1.2.1);[372] two which take the a-colour pattern in the present, *gonaid* 'wounds' and *maraid* 'lasts' (subsection 5.1.2.2); and two which form the present stem by infixing a nasal after the final sonorant of the root, *at·baill* 'dies' and *marnaid* 'betrays, deceives' (subsection 5.1.3.2).

Given the wide variety of verbs which take the ē-future, and the fact that some of them are of high frequency, it is perhaps unsurprising that it becomes productive. Already in the Old Irish period a number of weak verbs, such as *gataid* 'takes away' and the compounds of *scaraid* 'separates' (although curiously not *scaraid* itself), such as *eter·scara* 'divides' and *con·scara* 'destroys', take an ē-future. There are no examples of deponent flexion.

The flexion of the ē-future is identical to that of the a-subjunctive. In what follows, I have, as usual, divided up the examples by person and number. Subsection 6.2.3.1 examines active flexion, while 6.2.3.2 discusses the deponent flexion.

6.2.3.1. Flexion of the ē-future

The active flexion of the ē-future is examined in this subsection, beginning with the first person singular forms.

[371] No doubt reinforced by the occurrence of *dén-* /·dʹa∅ʹn-/ as the present prototonic forms of the highly frequent verb *do·gní* 'does, makes'.
[372] The verb *fo·geir* 'heats' also takes an ē-future, as does *do·fuissim* 'pours out', which is formed from the root *-sem-*. Verbs from the root *-em-*, on the other hand, such as *do·eim* 'covers, shelters' and *ar·eim* 'accepts, receives' sometimes take an f-future and sometimes an ē-future.

Table 133. 1st person singular flexion of the ē-future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
biid	‘does be’	AIII	H2	XV-	b′ə- → b′a∅
do·beir	‘carries’	BI	S1a	XVX-	·b′ar- → b′a∅°r-
gataid	‘takes away’	AI	W1	XVX-	gad- → g′a∅°d-
at·baill	‘dies’	BV	S1d	XVX-	·bal- → ·b′a∅°l-
do·gní	‘does, makes’	AIII	H2	XV-	·g′n′ə- → ·g′a∅°n-

Absolute

b′a∅-a∅	→	b′ə∅a∅	*bia*	Ml137b7

Conjunct

·g′a∅°d-	→	·g′a∅°d	*in·gét*	Wb9d4
·b′a∅°l-	→	·b′a∅°l	*at·bél*	Wb10d2
·g′a∅°n-	→	·g′a∅°n-	*du·gén*	Ml30b9

Conditional

·g′a∅°n-əN′	→	·g′a∅°nəN′	*do·genainn*	TBC[2]2874

I have not uncovered any examples of the absolute first person singular outside of the substantive verb, which has the regular a-subjunctive ending /-a∅/. The first person singular conjunct consists in merely the bare stem, again as in the a-subjunctive. The ending of the imperfect is /-əN′/. The following table gives forms of the second person singular of the ē-future.

Table 134. 2nd person singular flexion of the ē-future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
biid	‘does be’	AIII	H2	XV-	b′ə- → b′a∅
do·beir	‘gives’	BI	Sa	XVX-	·b′ar- → ·b′a∅°r-
do·gní	‘does, makes’	AIII	H2	XV-	·g′n′ə- → ·g′a∅°n-

Absolute

b′a∅-a∅′	→	b′ə∅a∅′	*bie*	*GOI*§788

Conjunct

·b′a∅°r-a∅′	→	·b′ə∅°ra∅′	*do·berae*	Ml44a20
·g′a∅°n-a∅′	→	·g′a∅°na∅′	*do·ngenae*[373]	Wb32a25

The absolute and conjunct second person singular both take the same ending as the a-subjunctive, i.e. /-a∅′/. I am not aware of any attestation of the conditional. The table below shows the third person singular forms of the ē-future.

[373] The initial of the stem is nasalised here as it is relative.

Table 135. 3rd person singular flexion of the ē-future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
biid	‘does be’	AIII	H2	XV-	bʹə- → bʹa∅
beirid	‘carries’	BI	Sa	XVX-	bʹar- → bʹa∅˚r-
maraid	‘lasts’	BI	S1c	XVX-	mar- → mʹa∅˚r-
gaibid	‘takes’	BII	S2	XVX-	gaβ- → gʹa∅˚β-
gniid	‘does, makes’	AIII	H2	XVX-	gʹnʹə- → gʹa∅˚n-
con·scara	‘destroys’	AI	W1	XVX-	·skar- → ·sʹkʹa∅˚r-
fo·gní	‘serves’	AIII	H2	XV-	·gʹnʹə- → ·gʹa∅˚n-
at·baill	‘dies’	BV	S1d	XVX-	·bal- → ·bʹa∅˚l-

Absolute

bʹa∅-aðʹ	→	bʹə∅əðʹ	*bieid*	Wb4d6
bʹa∅˚r-əθʹ	→	bʹa∅˚rəθʹ	*beraid*	Ml37a9
mʹa∅˚r-əθʹ	→	mʹa∅˚rəθʹ	*meraid*	Ml100b4
gʹa∅˚β-əθʹ	→	gʹa∅˚βəθʹ	*gebaid*	Wb8a7

Relative

bʹa∅-əs	→	bʹə∅as	*bias*	Sg207a5

Conjunct

·skʹa∅˚r-a∅	→	·skʹa∅˚ra∅	*con·scéra*	Wb26a8
·gʹa∅˚n-a∅	→	·gʹa∅˚na∅	*fo·géna*	Sg198a19
·bʹa∅-a∅	→	·bʹə-a∅	*ní·bia*	Sg147a10

Conditional

·bʹa∅-əθ	→	·bʹa∅əθ	*no·biad*	Wb9b25
·bʹa∅˚l-əθ	→	·bʹa∅˚laθ	*at·belad*	Ml26c10

The absolute third person singular ending is /-əθʹ/, while the relative has the regular ending /-əs/. In the conjunct, the same ending as the a-subjunctive is found, i.e. /-a∅/. The conditional ending is /-əθ/. The following table shows the first person plural forms.

Table 136. 1st person plural flexion of the ē-future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
biid	‘does be’	AIII	H2	XV-	bʹə- → bʹa∅
as·beir	‘says’	BI	Sa	XVX-	·bʹar- → ·bʹa∅˚r-
do·gní	‘does, makes’	AIII	H2	XV-	·gʹnʹə- → ·gʹa∅˚n-
ceilid	‘hides’	BI	S1a	XVX-	kʹal- → kʹa∅˚l-
at·baill	‘dies’	BV	S1d	XVX-	·bal- → ·bʹa∅˚l-

Absolute

bʹa∅-əmʹə∅ʹ	→	bʹamʹə∅ʹ	*beimmi*	Wb21b7

Conjunct

·bʹa∅-əμ	→	·bʹə-əμ	*in·biam*	Wb15a1
·bʹa∅˚r-əμ	→	·bʹa∅˚raμ	*as·béram*	Wb17c23
·gʹa∅˚n-əμ	→	·gʹa∅˚naμ	*du·ngenam*[374]	Ml111d3

[374] The initial of the stem is nasalised here as it is relative.

·kʹa∅˚l-əμ	→	·kʹa∅˚laμ	*·célam*	Fél Ep. 86
		Conditional		
·bʹa∅˚l-əmʹəsʹ	→	·bʹa∅˚ləsʹ	*at·bélmis*	Wb4d9
·gʹa∅˚n-əmʹəsʹ	→	·gʹa∅˚nməsʹ	*do·génmis*	Sg203a6

In the second person plural, the absolute has the ending /-əmʹə∅ʹ/, the conjunct /-əμ/, and the conditional /-əmʹəsʹ/. The following table shows the second person plural forms.

Table 137. 2nd person plural flexion of the ē-future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
biid	'does be'	AIII	H2	XV-	bʹə- → bʹa∅
at·baill	'dies'	BV	S1d	XVX-	·bal- → ·bʹa∅˚l-
do·gní	'does, makes'	AIII	H2	XV-	·gʹnʹə- → ·gʹa∅˚n-
gataid	'takes away'	AI	W1	XVX-	gad- → gʹa∅˚d-
		Absolute			
bʹa∅-əθaʹ∅ʹ	→	bʹaθʹaʹ∅ʹ		*bethe*	GOI§788
		Conjunct			
·bʹa∅-əθʹ	→	·bʹə-əθʹ		*ní·bied*	Wb9b17
·bʹa∅˚l-əθʹ	→	·bʹa∅˚ləθʹ		*at·belaid*	Ml29c4
·gʹa∅˚n-əθʹ	→	·gʹa∅˚nəθʹ		*do-n·génaid*[375]	Wb17a6
		Conditional			
·gʹa∅˚d-əθʹaʹ∅ʹ	→	·gʹa∅˚taʹ∅ʹ		*ní·gette*	Wb9c8

As in the first person plural, I have not uncovered any absolute tokens of the second person plural apart from in the substantive verb. The ending is anyway /əθaʹ∅ʹ/. The conjunct ending is /-əθʹ/, while that of the conditional is /-əθʹaʹ∅ʹ/. The following table shows the third person plural forms.

Table 138. 3rd person plural flexion of the ē-future

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
biid	'does be'	AIII	H2	XV-	bʹə- → bʹa∅
beirid	'carries'	BI	Sa	XVX-	bʹar- → bʹa∅˚r-
gniid	'does, makes'	AIII	H2	XVX-	gʹnʹə- → gʹa∅˚n-
marnaid	'betrays, deceives'	AI	W1	XVX-	mar- → mʹa∅˚r-
do·gní	'does, makes'	AIII	H2	XV-	·gʹnʹə- → ·gʹa∅˚n-
		Absolute			
bʹa∅˚r-ədʹ	→	bʹa∅˚r-ədʹ		*bérait*	TBC5773
		Relative			
gʹa∅˚n-ədʹaʹ∅ʹ	→	gʹa∅˚ndaʹ∅ʹ		*gende*	Wb93b16

[375] The initial of the stem is nasalised here as it is relative.

Conjunct				
·m′a∅˚r-əd	→	·m′a∅˚rad	*ni·mmerat*	Wb30c20
·b′a∅˚l-əd	→	·b′a∅˚lad	*at·bélat*	Wb1d4
·g′a∅˚n-əd	→	·g′a∅˚nad	*do·génat*	Wb13a13
Conditional				
b′a∅˚r-əd′əs′	→	b′a∅˚rdəs′	*no-nda·bértais*[376]	Ml124b6

The person ending for the third person singular absolute is /-əd′/ and that of the conjunct is /-əd/, as in other stem formations. The absolute relative ending is /-əd′a∅′/, while that of the conditional is /-əd′əs′/.

This concludes the discussion of the active flexion of the ē-future. The following subsection, 6.2.3.2, concludes the discussion of the future formations in this chapter by examining instances of the passive flexion.

6.2.3.2. Passive flexion of the ē-future

This subsection outlines the passive flexion of the ē-future, beginning with the general forms, which are laid out in the table below.

Table 139. Passive flexion of the ē-future: general forms

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
beirid	‘carries’	BI	Sa	XVX-	b′ar- → b′a∅˚r-
gniid	‘does, makes’	AIII	H2	XVX-	g′n′ə- → g′a∅˚n-
etar·scara	‘divides’	AI	W1	XVX-	·skar- → ·s′k′a∅˚r-
do·beir	‘gives’	BI	Sa	XVX-	·b′ar- → ·b′a∅˚r-
do·gní	‘does, makes’	AIII	H2	XV-	·g′n′ə- → ·g′a∅˚n-
Absolute					
b′a∅˚r-əθ′ər′	→	b′a∅˚rθar′		*bérthair*	BDD570
Relative					
b′a∅˚r-əθ′ər	→	b′a∅˚rθar		*bérthar*	Wb12d27
g′a∅˚n-əθ′ər	→	g′a∅˚ntar		*géntar*	Wb12b30
Conjunct					
·b′a∅˚r-əθ′ər	→	·b′a∅˚rθar		*do·berthar*	Ml24c2
g′a∅˚n-əθ′ər	→	g′a∅˚ntar		*do·géntar*	Sg27a13
·b′a∅˚r-əθ′ər	→	·b′a∅˚rθar		*in·bertar*	Wb15a3

[376] With third person plural infix pronoun /-da^{G}/.

The general passive forms of the ē-future have the expected endings: /-əθ′ər′/ for the absolute and /-əθ′ər/ for the relative and conjunct. The third person plural forms are given in the table below.

Table 140. Passive flexion of the ē-future: 3rd person plural forms

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
gniid	'does, makes'	AIII	H2	XVX-	g′n′ə- → g′a∅°n-
etar·scara	'divides'	AI	W1	XVX-	·skar- → ·s′k′a∅°r-
		Relative			
g′a∅°n-əd′ər	→	g′a∅°ndar		*géntar*	Ml69d6
		Conjunct			
s′k′a∅°r-əd′ər	→	s′k′a∅°rdər		*eter·scértar*	Wb8d3

Although I have not managed to uncover an absolute third person plural form in the glosses, the relative and conjunct endings are the expected /-əd′ər/. The following table shows the endings of the conditional.

Table 141. Passive flexion of the ē-conditional

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
do·gní	'does, makes'	AIII	H2	XV-	·g′n′ə- → ·g′a∅°n-
		General			
·g′a∅°n-əθ′a∅′	→	·g′a∅°n-θ′a∅′		*do·génta*	ITi 124.6

I am not aware of any passive third person plural example for the ē-conditional, but have come across a late general form, in which the final <ta> presumably reflects Old Irish /-əθ′a∅′/.

In this section, the various future formations found in Old Irish have been laid out, beginning with the f-future in 6.2.1, then moving on to the reduplicated s- and a-futures in 6.2.2, and then the ē-future in this subsection. The following section lays out the various formations of the last tense formation under discussion in this dissertation, the preterite.

6.3. The preterite stem

There are two distinct preterite stem formations in Old Irish. The preterite passive stem is not discussed in this dissertation, but the preterite active stem is the subject of this subsection.

There are essentially four principal preterite formations in Old Irish. All weak verbs take an s-preterite, as do many hiatus verbs. A small number of strong verbs also take an s-preterite, namely those with roots ending in /-β/, i.e. *ibid* 'drinks', *gaibid* 'takes', and their compounds, and *ad·gládathar* 'addresses'. Strong verbs with roots ending in /-l/ and /-r/, as well as some in /-μ/ or /-ɣ/ take a t-preterite. An ā-preterite is formed by a number of strong and hiatus verbs, some of them quite common, but it is not possible to predict which verbs take the ā-preterite on any phonological criteria. The remainder of strong verbs take a suffixless preterite, usually formed through reduplication of the root.

The following subsections examine each of these formations in turn, beginning with the s-preterite in 6.3.1, continuing with the t-preterite in 6.3.2 and then examining the ā-preterite in 6.3.3 and the reduplicated preterite in 6.3.4.

6.3.1. The flexion of the s-preterite

All weak verbs take an s-preterite. It is also the most common preterite formation for hiatus verbs with root initial u-colour, although both *foid* 'overnights and *asa·gú* 'chooses' have rather reduplicated formations. A hybrid of reduplication and the s-preterite is also attested for other hiatus verbs, but these are discussed rather in the subsection devoted to reduplicated formations (6.3.4), below. A small number of strong verbs take an s-preterite too, namely *ad·gládathar* 'addresses', *ibid* 'drinks' and *gaibid* 'takes', as well as their compounds.[377]

The formative for the s-preterite is /-əs-/ and the endings are, for the most part, the basic primary endings found in other sigmatic formations, such as the s-subjunctive

[377] Of these, *ibid* consistently has an i-colour stem-final consonant in the s-preterite, while *gabaid* has an a-colour stem-final consonant. This variation is not synchronically predictable (see Watkins 1962: 135f for the historical development).

(6.1.1) and the s-future (6.2.2), as well as in the present tense of many strong verbs. Generally, verbs have the same pattern of consonant colour in the s-preterite as in the present, but the causative verbs of McCone's W2b class often show stem-final a-colour rather than i-colour in the preterite, particularly when the vowel of the formative is not syncopated (*GOI*: §677; Stifter 2006: 202). The following paragraphs lay out the flexion of the s-preterite, with examples sorted by person and number, beginning with the first person singular

Table 142. 1st person singular flexion of the s-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
gaibid	'takes'	BII	S2	XVX-	gaβ-
túirid	'seeks, searches'	AII	W2a	XVX-	t°ə∅°r′-
anaid	'stays'	AI	WI	XVX-	∅an-
snaid	'swims'	AIII	H1	XV-	sna-
adbartaigther	'opposes'	AIII	H3	XVXVX-ig-	∅aðβart-əɣ′-
		Absolute			
gaβ-əs-ə∅°	→	gaβsə∅°		*gabsu*	Thes.ii 291.7
		Conjunct			
·t°ə∅°r′-əs-∅°	→	·t°ə∅°r°əs°		*ros·turus*[378]	Fél Jun 26
·∅an-əs-∅°	→	·∅an°əs°		*ní-ru·anus*	Wb14s29
·sna-əs-∅°	→	·sna∅əs°		*ro·snaus*	LU9436
		Deponent conjunct			
ˈ∅aðβart-ˌəɣ′-əs-ər°	→	·ˈ∅aðβarˌtəɣ′s′ər°		*ro·adbartaigsiur*	Ml115a3

The usual primary endings are found in the first person singular of the s-preterite. The absolute ending is /-ə∅°/, the conjunct ending /-∅°/ and the deponent conjunct /-ər°/. As can be seen from the examples, stem final u-colour, as occurs in the present of many strong verbs (see 5.1.2.1), is common. The following table shows the second person singular forms.

[378] With feminine third person singular infix pronoun /-s^{N}-/.

Table 143. 2nd person singular flexion of the s-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
soíraid	‘frees, liberates’	AI	W1	XVX-	s˚a∅′r-
cloid	’turns back’	AIII	H3	XV-	k˚l˚a-
lethnaigidir	‘spreads out’	AII	W2	XVXVX-ig-	L′aθan-əɣ′-

Absolute

s˚a∅′r-əs-ə∅′	→	s˚a∅′rsə∅′	*soersai*	Fél Ep. 447

Conjunct

·s˚a∅′r-əs-∅′	→	·s˚a∅′rəs′	*ro·soerais*	Fél Ep. 486
·k˚l˚a-əs-∅′	→	·k˚l˚a∅˚əs′	*ro·clois*	Ml43d18

Deponent conjunct

·ˈL′aθan-ˌəɣ′-əs-ər	→	·ˈL′aθˌnəg′s′ar	*lethnaigser*	Ml50a14

The primary endings are also found in the second person singular: absolute /-ə∅′/ and conjunct /-∅′/. The deponent conjunct ending is the sigmatic ending /-ər/. The following table shows the third person singular forms of the s-preterite.

Table 144. 3rd person singular flexion of the s-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
caraid	‘loves’	AI	W1	XVX-	kar-
bruid	‘smashes’	AIII	H3	XV-	b˚r˚ə-
gaibid	‘takes’	BII	S2	XVX-	gaβ-
anaid	‘stays’	AI	WI	XVX-	∅an-
léicid	‘leaves, lets go’	AII	W2a	XVX-	L′a∅′g′-
creitid	‘believes’	AII	W2a	XVX-	k′r′ad′-
cloid	’turns back’	AIII	H3	XV-	k˚l˚a-
as·luí	‘escapes’	AIII	H3	XV-	·L˚ə-
molaithir	‘praises’	AI	W1	XVX-	m˚al-

Absolute

kar-əs-∅′	→	karəs′	*carais*	Fél Jan. 27
b˚r˚ə-əs-∅′	→	b˚r˚ə∅˚əs′	*bruis*	Fél Apr 4
gaβ-əs-∅′	→	gaβəs′	*gabais*	Thes.ii 238.16

Conjunct

·∅an-(əs)	→	·∅an	*ru·an*	Thes.ii 242.13
·L′a∅′g′-(əs)	→	·L′a∅′g′	*ní·léicc*	Thes. ii 315.7
·k′r′ad′-(əs)-ə∅′	→	·k′r′ad′ə∅′	*ro·chretti*	Wb5a7
·k˚l˚a-(əs)-∅′	→	·k˚l˚a∅′	*ro·cloí*	Tur. 18
·L˚ə-(əs)-∅′	→	·L˚ə∅′	*at·lúi*	LL247b25

Deponent conjunct

m˚al-əs-tr	→	m˚alastar	*ro·mmolastar*	Ml126b16

The exponence of the absolute third person singular of the s-preterite is i-colour, represented here by /-∅′/. For the conjunct, matters are somewhat less straightforward. The /-əs/ formative typical of the s-preterite is lost, but the ending varies somewhat. Weak a-verbs are typically found with an a-colour final, which suggests the bare root without the formative. Weak i-verbs sometimes also show the bare root, in their case with i-colour, but frequently also end in /-ə∅′/, as in the present (5.1.1).

The ending /-ə∅′/ is typical also of *gniid* ‘does, makes’ and its compounds, which have a hybrid reduplicated s-preterite, discussed in 6.3.4, below. The hiatus verbs which take the s-preterite, be they reduplicated or not, seem to end in /-∅′/ as well, independent of their initial colour. The easiest formal solution is to posit the bare stem when that is consonant final, and the ending /-∅′/ after a vowel, with the /-ə∅′/ ending of the weak i-verbs an alternative modelled on the present .

For the deponent conjunct, the ending is the sigmatic ending /-tr/. The fact that it does not have a vowel is clear from the retention of the vowel of the s-preterite formative in *ro·mmolastar*. The following table shows the first person plural forms.

Table 145. 1st person plural flexion of the s-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
celebraid	‘celebrates’	AI	W1	XVXVXVX-	kʹalʹəβərʹ-
feraid	‘grants, affords’	AI	WI	XVX-	φʹərʹ-
túirid	‘seeks, searches’	AII	W2a	XVX-	t°ə∅°rʹ-
ibid	‘drinks’	BI	S1a	XVX-	∅ʹəβʹ-
feidligidir	‘abides’	AII	W2a	XVXVX-ig-	φʹaðʹəlʹ-əɣʹ-
		Relative			
kʹalʹəβər-əs-əmʹa∅′	→	kʹalʹəβʹərʹsʹəmʹa∅′	*celebirsimme*[379]		Arm184b2
		Conjunct			
·φər-əs-əμ	→	·φərsaμ	*ro·fersam*		Fél Ep. 2
·t°ə∅°rʹ-əs-əμ	→	·t°ə∅°rʹsʹaμ	*ro·thúirsem*		Fél Ep. 75
·∅ʹəβʹ-əs-əμ	→	·∅ʹəβʹsʹaμ	*ass·ibsem*		Wb12a17
		Deponent conjunct			
·ˈφʹaðʹəlʹ-ˌəɣʹ-əs-əmr	→	·ˈφʹaðʹəˌlʹəɣʹsʹamar	*ni-ru·feidligsemmar*		Ml105a4

[379] This verb appears to be somewhat variable in its inflexion, which given that it is a direct loan from the Latin verb, and seemingly literary, is hardly surprising. Both the citation form and perfect first person singular *aro·celebrus* (Wb14d31) show a failure to syncopate the second syllable and seem to be based on a root /kʹalʹaβr-/. The form shown here, as well as imperfect subjunctive third person plural *ara·celebartis* (Ml102d3) similarly fail to sycopate the second syllable and both behave rather as though they were based on a trisyllabic root, although the consonant colour of the /β/ and the /r/ differs between the two.

I am not aware of any examples of the absolute first person plural of the s-preterite, and of only one instance of the relative. The ending for the latter is the usual /-m′a∅′/, while that of the conjunct is /-əμ/. The deponent conjunct has the ending /-əmr/. The following table lays out the flexion of the second person plural of the s-preterite.

Table 146. 2nd person plural flexion of the s-preterite

Citation	Meaning		*GOI*	*EIV*	Root shape	Stem	
creitid	‘believes’		AII	W2a	XVX-	k′r′ad′-	
				Conjunct			
·k′rad′-əs-əθ′		→	·k′rad′s′əθ′		*ra·chreitsid*		Wb13b10

I am not aware of any examples of the absolute, but the conjunct ending is the usual ending /-əθ′/. The following table shows the third person plural forms.

Table 147. 3rd person plural flexion of the s-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem	
caraid	‘loves’	AI	W1	XVX-	kar-	
gaibid	‘takes’	BII	S2	XVX-	gaβ-	
léicid	‘leaves, lets go’	AII	W2a	XVX-	L′a∅′g′-	
scuirid	‘unjokes’	AII	W2b	XVX-	s°k°ar′-	
túirid	‘seeks, searches’	AII	W2a	XVX-	t°ə∅°r′-	
as·luí	‘escapes’	AIII	H3	XV-	·L°ə-	
do·soí	‘turns’	AIII	H3	XV-	·s°a∅′-	
ibid	‘drinks’	BI	S1a	XVX-	∅′əβ′-	
echtrannaigidir	‘alienates’	AII	W2a	XVXVXV-ig-	∅′axtraN-əɣ′-	
			Absolute			
kar-əs-əd′	→	karsəd′		*carsait*		Fél Mar 15
gaβ-əs-əd′	→	gaβsəd′		*gabsait*		Fél Oct 29
L′a∅′g′-əs-əd′	→	L′a∅′g′s′əd′		*léicsit*		Fél Oct 8
s°k°ar′-əs-əd′	→	s°k°ar′s′əd′		*scoirsit*		Fél May 17
			Relative			
gla∅′d′-əs-əd′a∅′	→	gla∅′d′s′əd′a∅′		*glaidsete*		Wb93b14
			Conjunct			
·t°ər′-əs-əd	→	·t°ər′s′ad		*ru·tuirset*		Ml44d23
·s°a∅′-əs-əd	→	·s°a∅°s′ad		*do·soiset*		TBC[2]2968
·L°ə∅′-əs-əd	→	·L°ə∅°s′ad		*as·luiset*		Laws i 64.3
·∅′əβ′-əs′-əd	→	·∅′əβ′s′ad		*at·ibset*		Thes.ii 323.15
			Deponent conjunct			
·ˈ∅′axtraN-ˌəɣ′-əs-ədr	→	·ˈ∅′axtraˌNəɣ′s′adar		*ro·echtrannaigsetar*		Ml66d2

As can be seen from the table, the endings of the third person plural in the s-preterite are the usual primary endings: /-cd′/ for the absolute, /-əd′a∅′/ for the relative, and /-əd/ for the conjunct. The ending for the deponent conjunct is here /-ədr/, although it is my impression that active flexion is much more common than deponent flexion in the third person plural of the s-subjunctive, at least in the glosses, even for verbs which usually have deponent forms.

This concludes the discussion of the s-preterite. The following subsection examines the flexion of the t-preterite.

6.3.2. The flexion of the t-preterite

All strong verbs with roots ending in /-r/ or /-l/, and many ending in a velar, as well as the roots *em*- and *sem*- take a t-preterite. The t-preterite entails the addition of /-t-/ to the root, with some relatively minor changes.

For the two roots in /-μ/, this is reduced to /-∅′-/ in the t-preterite and the /-t-/ formative appears rather as /-d-/. Roots ending in a velar have a t-preterite in /-xt/, although the one root in /-rg-/, i.e. *orcaid* ‘kills, slays’, has the t-preterite stem *ort*-, with loss of the velar. The verb *saigid* ‘seeks, approaches’ combines reduplication with the t-preterite, and is dealt with rather with the reduplicated formations in 6.3.4, below.

The final of the t-preterite stem always has a-colour, regardless of the colour of the final consonant of the root. Generally, the initial colour of the t-preterite stem corresponds to that of the root, although *marnaid* ‘betrays, deceives’ has initial i-colour, as in the subjunctive, and the verbs built on the root *reg*-, such as *at·reig* ‘rises’, nearly always have a preterite stem with initial a-colour, i.e. *racht*-. The verb *at·baill* ‘dies’, which takes initial i-colour in the subjunctive (and future) retains its root a-colour in the t-preterite.

The following paragraphs give examples of the flexion of the t-preterite. Outside the third person, there are precious few examples of the absolute, but the conjunct is well attested. However, from the available evidence, it is only in the third person singular where differences between the absolute and conjunct are apparent. Like the ā-preterite, discussed in 6.3.3, below, and the reduplicated preterite, discussed in 6.3.4,

the t-preterite does not distinguish between absolute and conjunct endings in the plural. The following table shows the first person singular forms of the t-preterite.

Table 148. 1st person singular flexion of the t-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
do·beir	'gives'	BI	S1a	XVX-	·b′ar- → ·b′art-
do·eim	'covers, shelters'	BI	S1a	XVX-	·∅′aμ- → ·∅′a∅′t-
fris·oirc	'offends'	BI	S1c	XVX-	·∅°arg- → ·∅°art-
do·meil	'spends, consumes'	BI	S1a	XVX-	·m′al- → ·m′alt-
at·baill	'dies'	BIV	S1d	XVX-	·bal- → ·balt-
ar·foím	'receives'	BI	S1a	XVX-	·φ°a∅′μ → ·φ°a∅′a∅′t-

Conjunct

·b′ar-t-∅°	→	·b′ər°t°	*do-m·biurt*[380]	ZCP4[381]
·R-∅′a∅′t-∅°	→	·R′a∅′t°∅°	*do·rret*	Wb31a1
·k°aμ-∅°ərt-∅°	→	·k°aμ°ər°t°	*fris·comurt*[382]	Wb33a12
·t°a-R°a-m′alt-∅°	→	·t°ar°m°əl°t°	*ni·tormult*	Wb18a10
·R^{L}-φ°a-∅′a∅′t-∅°	→	·R°a∅′at°	*ar·roiéit*	Wb6d4

I am not aware of any examples of absolute of the first person singular in the t-preterite. The conjunct ending is /-∅°/, with the vowel raising typical of this ending found also in the present tense of strong verbs (see 5.1.2.1). Occasional examples of the ending /-∅/, e.g. *'tbalt* (LU9496), *at·rubalt* (LU9514), from *at·baill* 'dies', are late. The following table shows the second person singular forms.

Table 149. 2nd person singular flexion of the t-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
do·beir	'gives'	BI	S1a	XVX-	·b′ar- → ·b′art-
meilid	'grinds, crushes'	BI	S1a	XVX-	m′al- → m′alt-

Conjunct

·b′art-∅′	→	·b′ər′t′	*do·birt*	Ml56a13
·m′alt-∅′	→	·m′al′t′	*ro·meilt*	HMin 71.4

The usual primary ending /-∅′/ is used for the conjunct second person singular of the t-preterite. The raising often found with this ending in the present of the alternating pattern of strong verbs (5.1.2.1) is found here in the first example, but not in the second. The next table examines the third person singular forms of the t-preterite.

[380] With first person singular infix pronoun /-$μ^{L}$/.
[381] Meyer, Kuno (1903). 'Mitteilungen aus irischen Handschriften' in ZCP 4: 31-47 (43.4)
[382] This verb takes *con-* rather than *ro-* to mark the resultative.

Table 150. 3rd person singular flexion of the t-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
beirid	‘carries’	BI	S1a	XVX-	b′ar- → b′art-
meilid	‘grinds, crushes’	BI	S1a	XVX-	m′al- → m′alt-
ailid	‘nourishes, rears’	BI	S1a	XVX-	∅al- → ∅alt-
as·beir	‘says’	BI	S1a	XVX-	·b′ar- → ·b′art-
sernaid	‘arrays, disposes’	BIV	S1d	XVX-	s′ar- → s′art-
ar·gair	‘forbids, prevents’	BII	S2	XVX-	·gar′- → ·gart-
dligid	‘is entitled to, owed’	BI	S1a	XVX-	d′l′əɣ- → d′l′əxt-
ar·foím	‘receives’	BI	S1a	XVX-	·φ°a∅′μ → ·φ°a∅′a∅′t-

Absolute				
b′art-∅′	→	b′ər′t′	*birt*	Arm18b1[383]
m′alt-∅′	→	m′əl′t′	*milt*	ZCP8[384]
Relative				
∅alt-a∅′	→	∅alta∅′	*altae*	LU10602
Conjunct				
·b′ərt-	→	·b′art	*as·bert*	Ml16c10
·s′ərt-	→	·s′art	*ro·sert*	Fél Ep.11
·gart-	→	·gart	*ar·gart*	Ml55c1
·d′l′axt-	→	·d′l′axt-	*ro·dlecht*	Thes.ii 347.34
·R^{L}-φ°a∅′a∅′t-	→	·R°a∅′at	*ara·roiat*	Ml24d28

The absolute third person singular of the t-preterite is characterised by vowel raising and by the ending /-∅′/, much like the conjunct second person singular. Byforms without the vowel raising are also found, but are later, e.g. *bert* (ED 108.10) for *birt* (Arm18b1). The absolute relative, coming after /-t-/, has the ending /-a∅′/, as discussed in 4.3.3, above.

The conjunct has no ending, but rather reflects the bare stem. For the perfect conjunct third person singular of *ar·foím* ‘receives’ a variety of spellings are found in the glosses, e.g. *ar·roét* (Ml17a7; Ml17c7), *ara·roéit* (Wb24a32) and *ara·róit* (Wb4b19; Wb32d10). This is reflective of the difficulty in rendering such a form in light of the analogical pressure from forms of *ar·eim* ‘accepts, receives’, on which it is built. The latter presumably had a straightforward long vowel /a∅′/, as in *do·et* /·∅′a∅′d/ (TBC^{2}2983) from *do·eim* ‘covers, shelters’.

The following table examines the flexion of the first person plural forms of the t-preterite.

[383] Thes.ii 242.17.
[384] Meyer (1912b: 308.3).

Table 151. 1st person plural flexion of the t-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
marnaid	'betrays, deceives'	BV	S1d	XVX-	mar- → m′art-
as·beir	'says'	BI	S1a	XVX-	·b′ar- → ·b′art-
ar·foím	'receives'	BI	S1a	XVX-	·φ°a∅′μ → ·φ°a∅′a∅′t-

Absolute				
m′art-əmr	→	m′artamar	*mertamar*	TBC[2] 290

Conjunct				
·R°a[L]-bart-mər	→	·R°əβartmar	*as·rubartmar*	Wb8d26
·R[L]-φ°a∅′a∅′t-mər	→	·R°a∅′tmar	*ar·róitmar*	Wb9c10

The first person plural ending of the t-preterite is /-mər/ for the conjunct. One might expect the same ending in the absolute as well, although the absolute example in the table above suggests rather the ending /-mər/. It should be noted from the examples that the root *beir-* has initial a-colour when it comes into unstressed position. Comparable in this regard is the well known deuterotonic-prototonic alternation in the present of verbs built on this root, e.g. deuterotonic *do·beir* 'gives', but prototonic *ní·tabair* 'does not give' (see 4.2.3 and 5.1.2.1 above). The following table lays out the flexion of the second person plural forms of the t-preterite

Table 152. 2nd person plural flexion of the t-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
do·éirrig	'forsakes'	BI	S1a	XVX-	·∅′a∅′r′əɣ- → ·∅′a∅′raxt-[385]
ar·foím	'receives'	BI	S1a	XVX-	·φ°a∅′μ → ·φ°a∅′a∅′t-

Conjunct				
·R-∅′a∅′raxt-əθ′	→	·R′a∅′raxtəθ′	*do·rérachtid*	Wb18c6
·R[L]-φ°a∅′a∅′t-əθ′	→	·R°a∅′təθ′	*ar·róittid*	Wb13a13

I am unaware of any instances of the absolute second person plural of the t-preterite, but the conjunct ending is the usual /-əθ′/. The following table lays out the third person plural forms.

[385] The a-colour /-r-/ in this form, which is a compound of *reg-*, viz. *to-es-reg-*, is found also in other verbs based on that root, e.g. *at·racht* (LU8420), preterite third person singular of *at·reig* 'rises'.

Table 153. 3rd person plural flexion of the t-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
sernaid	‘arrays, disposes’	BIV	S1d	XVX-	s′ar- → s′art-
orcaid	‘kills, slays’	BI	S1c	XVX-	∅°arg- → ∅°art-
geilid	‘grazes’	BI	S1a	XVX-	g′al-→ ∅alt-
beirid	‘carries’	BI	S1a	XVX-	b′ar- → b′art-
do·beir	‘gives’	BI	S1a	XVX-	·b′ar- → ·b′art-
for·beir	‘grows’	BI	S1a	XVX-	·b′ar- → ·b′art-
marnaid	‘betrays, deceives’	BV	S1d	XVX-	mar- → m′art-

Absolute				
s′art-ədr	→	s′artadar	*sertatar*	O’C 2254
∅°art-ədr	→	∅°artadar	*ortatar*	LL14b32
g′alt-ədr	→	g′altadar	*geltatar*	LU4733
Relative				
b′art-ədr	→	b′artar	*bertar*	Ml127d6
b′art-ədr	→	b′artadar	*bertatar*	Tur. 130
Conjunct				
·b′art-ədr	→	·b′artar	*do-s·bertar*	Tur. 128
·R°a^{L}-bart-ədr	→	·R°aβartadar	*for·rubartatar*	Ml101a10
·m′art-ədr	→	·m′artadar	*ro·me(r)tatar*	Ml75d5

The ending of the third person plural of the t-preterite is /-ədr/ for absolute, relative, and conjunct. The disyllabic relative form *bertar* (Ml127d6) most likely results from the not uncommon loss of a vowel between dentals, although confusion with the isomorphic third person plural passive forms cannot be excluded. One could posit rather an alternative ending /-dər/, in parallel to the variation found in the first person plural, but this variation seems to be otherwise largely absent in the third person plural. For example, the perfect of *as·beir* says is found several times in the glosses in the first person plural with the form *as·rubartmar* (Wb8d26; Sg55b5 etc.), pointing clearly towards the ending /-mər/. The third person plural however has a vowel between the characteristic /-t-/ formative and the /-d-/ of the ending, i.e. *as·rubartatar* (Wb18d1), and similarly from *for·beir* ‘grows’ the form *for·rubartatar* (Ml101a10) is found.

This concludes the discussion of the t-preterite. The following subsection outlines the flexion of the ā-preterite.

6.3.3. Flexion of the ā-preterite

A small number of strong and hiatus verbs verbs take an ā-preterite. For this formation, the initial of the stem always has a-colour and the vowel of the stem is always /a∅/. This can be seen as a template /X^xVC^y-/ → /Xa∅C-/ and is thus similar to the ē-future, discussed in 6.2.3, in that a quite rigid template is enforced.

This pattern is most frequently attested for the substantive verb, but is also found in a number of strong verbs, such as *guidid* 'prays', *figid* 'weaves, plaits', *teichid* 'flees', *reithid* 'runs', *feidid* 'brings, leads', *scoichid* 'comes to an end',[386] *daimid* 'suffers',[387] *ro·laimethar* 'dares'. There is no apparent conditioning here, although it should be noted that two of the four strong verbal roots with final /-μ/ are represented, and that a number of the others have ablative semantics (particularly if the alternative meaning of *scoichid* as 'moves from, proceeds' is taken into consideration). In later sources, an ā-preterite is also attested for *sreid* 'scatters, casts'.

Two further verbs, *fo·ceird* 'throws' and *sceirtid* 'scrapes off', appear to have a short a-preterite, with /a/ rather than /a∅/ in the stem, implying a template /X^xVRC^y-/ → /XaRC-/. While the latter verb is not particularly well-attested, the former is, strongly suggesting that this is not just a case of the relevant forms being written without the mark of length. The templatic representations shown here are based on Thurneysen's plausible insight that the lack of a long vowel in these forms can be attributed to the fact that they have a sonorant before the final consonant (*GOI*: §694). This means that the sonorant effectively fills the slot in the template which would otherwise be filled by the abstract consonant.

Deponent forms in the ā-preterite are confined to the relevant forms of *ro·laimethar*. Verbs based on the root *icc*-, such as *do·icc* 'comes' and *con·icc* 'is capable of', and *ro·icc* 'reaches' have exceptional preterite stems with *ánac*-, corresponding cleanly to neither the ā-preterite or reduplicated types. An exposition of the flexion of the ā-preterite follows, beginning with the first person singular.

[386] The exact shape of the root of this verb, as well as its conjugation class in the present, is somewhat unclear. It is possible that two roots have been confused (Schulze-Thulin 2001: 132f.) and that there is a semantic distinction between the apparent forms of this root which are conjugated as weak and those which are conjugated as strong (Schumacher 2004: 163).
[387] Both an s-preterite and a t-preterite are also attested for this verb.

Table 154. 1st person singular flexion of the ā-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
biid	‘does be’	AIII	H2	XV-	bʹə- → ba∅-
guidid	‘prays, asks’	BII	S2	XVX-	g˚əðʹ- → ga∅ð-
		Absolute			
ba∅-	→	ba∅		*bá*	LU9407
		Conjunct			
·ga∅ð-	→	·ga∅ð		*ro·gád*	Fél Ep. 412
·ba∅-	→	·ba∅		*ro·bá*	Wb28a9

The evidence suggests that the first person singular of the ā-preterite is marked by the bare stem in both the absolute and conjunct. The flexion of the second person singular is shown in the table below.

Table 155. 2nd person singular flexion of the ā-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
biid	‘does be’	AIII	H2	XV-	bʹə- → ba∅-
		Conjunct			
·ba∅-	→	·ba∅		*ro·bá*	Wb28a9

Similarly to the first person singular, the second person singular of the ā-preterite is represented by the bare stem. To my knowledge, the absolute is not attested. The flexion of the third person singular is given in the table below.

Table 156. 3rd person singular flexion of the ā-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
biid	‘does be’	AIII	H2	XV-	bʹə- → ba∅-
teichid	‘flees’	BI	S1a	XVX-	tʹax- → ta∅x-
reithid	‘runs’	BI	S1a	XVX-	Rʹaθ- → Ra∅θ-
ro·laimethar	‘dares’	BII	S2	XVX-	Laμʹ- → La∅μ-
figid	‘weaves, plaits’	B	S	XVX-	φʹəɣ- → φa∅ɣ-
scoichid	‘comes to an end’	B	S	XV-	s˚k˚axʹ- → ska∅x-
sceirtid	‘scrapes off’	B	S	XV-	skʹarʹtʹ- → skart-
		Absolute			
ba∅-∅ʹ	→	ba∅ʹ		*bái*	Wb27a6
ta∅x-∅ʹ	→	ta∅xʹ		*taích*	Ml32b24
Ra∅θ-∅ʹ	→	Ra∅θʹ		*ráith*	Fél Sep 19
		Relative			
ba∅-∅ʹa∅ʹ	→	ba∅ʹa∅ʹ		*boie*	Arm18b1
		Conjunct			
·ba∅-∅ʹ	→	·ba∅ʹ		*ni·boí*	Wb17d17

·φa∅ɣ-∅′	→	·φa∅ɣ′	*ro·fáig*	MDiv 96.52
·ska∅x-∅′	→	·ska∅x′	*ro·scáich*	Fél Pro. 121
·skart-∅′	→	·skart′	*ro·scaird*	Ml14b2
		Deponent absolute		
La∅μ-er′	→	La∅μər′	*lámair*	AIDii 18§19
		Deponent conjunct		
·La∅μ-r′	→	·La∅μər′	*ro·lámair*	Fél Pro. 58

In the active, for both absolute and conjunct, the ending of the ā-preterite is /-∅′/. For the deponent, it is seemingly /-r′/, again for both absolute and conjunct. It should be noted that for the third person singular of the substantive verb, spellings with <o> are more common than those with <a>, e.g. *bói* (Wb10d13). Already in the Old Irish period u-colour and a-colour appear to be falling together before /a∅′/, i.e. <oí> and <aí> are ceasing to be distinctive (see 3.2.3.3).

The following table lays out the flexion of the first person plural of the ā-preterite.

Table 157. 1st person plural flexion of the ā-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
biid	‘does be’	AIII	H2	XV-	b′ə- → ba∅-
		Absolute			
ba∅-mər	→	ba∅mar		*bámar*	SR3286
		Conjunct			
·ba∅-mər	→	·ba∅mar		*ro·bámmar*	Wb20d12

In both absolute and conjunct, one would expect the ending for the first person plural of the ā-preterite to be /-əmr/, although only forms with the substantive verb are found, and with this rather the ending /-mər/, found also in the t-preterite, is used. The second person plural forms are shown below.

Table 158. 2nd person plural flexion of the ā-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
biid	‘does be’	AIII	H2	XV-	b′ə- → ba∅-
		Absolute			
ba∅-əθ′	→	ba∅əθ′		*baid*	*GOI*: §789
		Conjunct			
·ba∅-əθ′	→	·ba∅əθ′		*ru·baid*	Wb3b19

As for the other persons, the second person plural ā-preterite does not distinguish between absolute and conjunct: the ending for both is /-əθ′/. The flexion of the third person plural is shown in the table below.

Table 159. 3rd person plural flexion of the ā-preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
biid	'does be'	AIII	H2	XV-	b′ə- → ba∅-
guidid	'prays, asks'	BII	S2	XVX-	g°əð′- → ga∅ð-
reithid	'runs'	BI	S1a	XVX-	R′aθ- → Ra∅θ-
daimid	'suffers, endures'	BII	S2	XVX-	daμ′- → da∅μ-
feidid	'brings, leads'	BI	S1a	XVX-	φ′að- → φa∅ð-

Absolute				
ga∅ð-ədr	→	ga∅ðadar	*gádatar*	Thes.ii 313.1
ra∅θ-ədr	→	ra∅θadar	*ráthatar*	Fél Sep 18
Relative				
ba∅-dər	→	ba∅dar	*batar*	Ml123b5
Conjunct				
·ga∅ð-ədr	→	·ga∅ðadar	*ro·gádatar*	CA§31
·φa∅ð-ədr	→	·φa∅ðadar	*ro·fadatar*	Wb29c13

In the third person plural of the ā-preterite, the ending is /-ədr/ for absolute, absolute relative and conjunct, although rather the ending /-dər/ would appear to be found with the substantive verb.

This concludes the discussion of the flexion of the reduplicated preterite. The following subsection examines the reduplicated preterite formations of Old Irish.

6.3.4. The flexion of the reduplicated preterite

The reduplicated preterite shows considerably more variety in terms of its inflexion than the reduplicated futures discussed in 6.2.2. A number of distinct patterns may be observed. There is a basic reduplicating template for verbs XVX- roots that shows some variation in terms of consonant colour. A small number of verbs beginning with XVX- roots also have a preterite with long <í> which cannot be straightforwardly derived from a reduplicating template, but which are discussed here as they are normally associated with the these formations. For XV- roots, a slightly different template is found.

The typical prototype for verbs with XVX- roots involves a reduplicating syllable with i-colour followed by a-colour in the following segment. This can be expressed as a template of the form /$X^{x}_{1}VX^{y}_{2}$-/ → /$C'_{1}a^{L}$-X_{1}əX^{y}_{2}-/, e.g. third person singular *cechaing* (Fél May 22) from *cingid* 'steps'. In a small number of roots, the initial of the reduplicating syllable retains the colour of the root. This is u-colour in the case of a number of verbs which take a nasal infix before an obstruent in the present (see 5.1.3.1), e.g. third person singular *at·bobuid* (LU10954)[388] from *ad·boind* 'refuses', although reduplication with i-colour is also attested in this group.[389] For the verb *canaid* 'sings', the reduplicating syllable sometimes has a-colour, e.g. *ro·cachain* (Ml48b11), and sometimes i-colour.

Thurneysen identifies a separate ī-preterite in a number of verbs, including *ernaid* 'bestows, grants', *fichid* 'fights', *ad·fét* 'tells, relates',[390] and *midithir* 'judges'. McCone (1987: 53) considers the first three to be reduplicated formations showing contraction, e.g. /φ′ə∅′əC/ → /∅′ə∅′C-/ and omits to discuss *midithir*, although it is likely that the diachronic development is more complex than this (Nikolaev 2010). In terms of the synchronic analysis of these, it seems easiest to see these verbs in terms of a template /X′ə∅′X-/, along the lines of the ā-preterite discussed in 6.3.3 above, and the ē-preterite examined in 6.2.3.

For XV- roots beginning in a single consonant, i.e CV- roots, the template is rather /X^{x}_{1}V-/ → /X'_{1}ə^{L}-X^{x}_{1}-/. This can be observed for both verbs with XV- roots which take a nasal infix in the present (see 5.1.3.3) and for genuine hiatus verbs (see 5.1.4) from all three of McCone's different hiatus verb classes.[391] Thus, third person singular *dith* (DIL 16635) from *dinid* 'suckles', *arros·fi* (Carney 1958: 10§1) from *ar·fen* 'debars', *ro·chich* (BDD 106) from *ciid* 'weeps'. Further examples are given below. As in the future (6.2.2), the verb *benaid* 'strikes' has exceptional reduction of /β′/ to /∅′/.

The verb *fo·gaib* 'finds, meets with' takes a suppletive preterite, e.g. third person singular *fo·fuair* (Fél Nov 7), which can be straightforwardly derived from the usual

[388] In this example, and in a number of others whose roots begin with u-colour, e.g. *geguin* (Fél Oct 22) from *gonaid* 'wounds', this u-colour is retained in the second syllable of the reduplicated preterite.
[389] For the development of these forms, see the discussion in Prósper (2002: 159).
[390] Preterite forms in <ía> for this verb are also securely attested.
[391] H1 *baid* 'dies', H2 *ciid* 'weeps', H3 *foid* 'overnights'.

XVX- template,[392] although from a root which is unattested as a simple verb. With the same inflexion are likely the forms of *oidid* ‘lends’, such as third person singular *ro·huaid* (Laws v 368.18). The inflexional pattern of these verbs, with hiatus, is also represented by the suppletive perfective of *téit* ‘goes’, based on *de-com-fed-*, e.g. third person singular do·chooid (Thes.ii 241.11). The preterite of *ithid* ‘eats’, based on *de-fo-ed-*, is inflected similarly except in the first and second persons singular, where it rather conforms to the s-preterite inflexion.

For verbs with XV- roots beginning in a consonant cluster, i.e. CCV- roots, the pattern is essentially the same as for those with CV- roots, but in these cases the initial consonant of the cluster is reduced to /∅°/. This can be expressed as the template /$C^x_1C^x_2$V-/ → /C^x_1ə∅°C^x_2-/. This group includes verbs such as *glenaid* ‘sticks’, *tlenaid* ‘takes away, steals’, *crenaid* ‘buys’ and *ara·chrin* ‘decays, fails’. Verbs with nasal presents built on *gni-* can also be included here, but they have /a/ rather than /ə/ in the reduplicating syllable, e.g. *in·géuin* /·g′a∅°n′/ (Ml69a15), from *as·gnin* ‘recognises’.

For *gniid* ‘does, makes’ and its compounds, especially *do·gní* ‘does, makes’, the stem formation is the same as for *as·gnin* etc., but is combined with the flexion of the s-preterite. This is also the case in *con·sénai* (Thes.ii 315.3) from *con·sní* ‘contests’. Hybrid formations with both reduplication and an s-preterite are similarly attested quite regularly for hiatus verbs with initial a-colour (5.1.4) and later also for many of the verbs with XV- roots that take a nasal infix in the present (5.1.3.3). The verb *saidid* ‘sits’ has reduplication combined with the t-preterite.

The original root vowel often disappears entirely in the reduplicated preterite forms of verbs with XV- roots. An exception is presented by the forms of *ro·cluinethar*, which however have /∅/ instead of /∅°/, and retain the root vowel, e.g. third person singular *ro·chúalae*. There is evidence that this is also the case for hiatus verbs whose roots begin with a-colour, which often retain the /a/ and from a relatively early period are also found with s-preterite flexion as well as reduplication.

Many of the particularities of reduplication in the future, discussed in 6.2.2, above, hold true also in the preterite. Thus /s/ in initial /sC/ is lost entirely under reduplication, e.g. third person singular *senaig* (Fél May 15) from *snigid* ‘drips’, and verbs whose roots go back to historic **sw* see these lenited to /φ/ under reduplication.

[392] That *·fuair* is disyllabic is confirmed by the metre of the poem.

Reminiscent of the forms with /β/ in the future, are two verbs, *lingid* ‘leaps’, and *dringid* ‘climbs’, which have the preterite stems *leblang*- and *debrang*- respectively.

As in the reduplicated futures, there is occasional confusion with respect to the first consonant of an initial cluster of sonorant and obstruent. For the third person singular of *glenaid* ‘sticks’, both *giuil* (Rawl118a2) and *·giguil* (Rawl84b55) are found even in the same corpus, while verbs such as *in·greinn* ‘persecutes’, *in·gleinn* ‘investigates’, and *fo·gleinn* ‘learns’ have a tendency to retain a fricative in this context. However, unlike in the future, such variation is largely predictable by stem shape in the preterite: there is ordinary lenition in disyllabic stems, and reduction to /∅°/ in monosyllabic ones beginning in a consonant cluster.[393] Given this predictability, I have written the superscript for lenition as usual below, even though the outcomes in the latter cases are not those which typically occur in the morphosyntactically conditioned consonant mutation found in the initial of the nuclear constitutent (see 3.2.1.4).

The following paragraphs give examples for the flexion of the reduplicated preterite for each person and number. Given that the flexion of the reduplicated preterite does not distinguish between absolute and conjunct flexion, I have combined these in the examples. However, because of the variety one can observe, I have included more examples than usual and seen fit to subdivide the examples based on the shape of the root. This involves labelling root types under each heading, as elsewhere I have done for absolute and conjunct, and dealing with XVX- and XV- roots in separate sections entirely in the case of the third person singular, where examples are most numerous. Discussion begins, as usual, with the first person singular.

Table 160. 1st person singular flexion of the reduplicated preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
naiscid	‘binds’	BI	S1a	XV-	Nask- → N′a^{L}-Nask-
as·gnin	‘recognises’	BV	S3	XVX-	·g′n′ə- → ·g′a^{L}-gn-
ro·cluinethar	‘hears’	BV	S3	XVX-	·k°l°ə- → ·k°a^{L}-kla-
		XV- root			
·g′a^{L}-gn-	→	·g′a∅°n		*ad·gén*	Wb12c13
·k°a^{L}-kla-	→	·k°a∅la∅		*ro·chuala*	MT157.4
		XVX- root			
N′a^{L}-Nask-	→	·N′anask		*ro·nenasc*	LU9373

[393] The forms of *ro·cluinethar*, despite being disyllabic, show the reduction typical of the monosyllabic stems.

The exponence of the first person singular in is a-colour, represented formally here as the bare stem. The following table shows the second person singular forms.

Table 161. 2nd person singular flexion of the reduplicated preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
as·gnin	‘recognises’	BV	S3	XVX-	·gʹnʹə- → ·gʹa^{L}-gn-
ro·cluinethar	‘hears’	BV	S3	XVX-	·k˚lʹə- → ·k˚a^{L}-kla-
		XV- root			
k˚a^{L}-kla-	→	·k˚a∅la∅		*ro·chuala*	Wb28c22
		XV- root with s-preterite inflexion			
·gʹa^{L}-gn-	→	·gʹa∅˚n		*as·gen*	Ml140b3

As in the first person singular, the second person singular has no ending, consisting rather in the bare stem. Third person singular forms with XV- roots are shown below.

Table 162. 3rd person singular flexion of the reduplicated preterite: XV- roots

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
ciid	‘weeps’	AIII	H2	XV-	kʹə- → kʹə^{L}-k-
lenaid	‘remains, attaches to’	BIV	S3	XV-	Lʹə- → Lʹə^{L}-L
as·ren	‘pays out, expends’	BIV	S3	XV-	Rʹə- → ·Rʹə^{L}-R-
ar·fen	‘debars’	BIV	S3	XV-	φʹə- → φʹə^{L}-φ-
baid	‘dies	AIII	H1	XV-	ba- → bʹə^{L}-ba-
imm·rá	‘navigates’	AIII	H1	XV-	·Ra- → ·Rʹə-Ra-
glenaid	‘sticks’	BIV	S3	XV-	gʹlʹə- → gʹə^{L}-gl-
crenaid	‘buys’	BIV	S3	XV-	kʹrʹə- → kʹə^{L}-kr-
tlenaid	‘takes away, steals’	BIV	S3	XV-	tʹlʹə- → tʹə^{L}-tl-
as·gnin	‘recognises’	BV	S3	XV-	·gʹnʹə → ·gʹa^{L}-gn-
ro·cluinethar	‘hears’	BV	S3	XV-	·k˚lʹə- → ·k˚a^{L}-kla-
raid	‘rows’	AIII	H1	XV-	Ra- → Rʹə^{L}-Ra-
do·gní	‘does, makes’	AIII	H2	XV-	·gʹnʹə- → ·gʹa^{L}-gn-
con·sni	‘contends’	AIII	H2	XV-	·sʹnʹə- → ·sʹa^{L}-sn-
		CV- root			
·kʹə^{L}-k-∅ʹ	→	·kʹəxʹ		*ro·chich*	BDD 106
Lʹə^{L}-L-∅ʹ	→	Lʹəlʹ		*lil*	IB62
·Lʹə^{L}-L-∅ʹ	→	·Lʹəlʹ		*ro·lil*	Ml54d7
·Rʹə^{L}-R-∅ʹ	→	·Rʹərʹ		*as·rir*	Thes. ii 342.2
·φʹə^{L}-φ-∅ʹ	→	·φʹə∅ʹ		*arros·fí*	Ériu 18[394]
·Rʹə^{L}-Ra-∅ʹ	→	·Rara∅ʹ		*imm·rerae*	Sg62b7
·bʹə-ba-∅ʹ	→	·bʹaβa∅ʹ		*ro·mbebae*[395]	Wb3b3

[394] Carney (1958: 10 §1).
[395] The initial of the stem is nasalised here as it is relative.

CV- root with s-preterite inflexion				
b′ə^{L}-ba-əs-∅′	→	b′aβəs′	*bebais*	Fél Apr 23
R′ə^{L}-Ra-əs-∅′	→	R′arəs′	*reris*	IB §61
·g′a^{L}-gn-(əs)-ə∅′	→	·g′a∅°nə∅′	*do·géni*	Sg185b4
·s′a^{L}-sn-(əs)-ə∅′	→	·s′a∅°nə∅′	*con·sénai*	Thes.ii 315.3
CCV- root				
g′ə^{L}-gl-∅′	→	g′ə∅°l′	*giuil*	Rawl 118a2
·g′ə^{L}-gl-∅′	→	·g′ə∅°l′	*ro-t·giuil*	Thes.ii 290.14
·k′ə^{L}-kr-∅′	→	·k′ə∅°r′	*ní·ciuir*	Thes.ii 332.3
·t′l′ə^{L}-tl-∅′	→	·t′ə∅°l′	*nac(h)-am·thiúil*	ZCP 29[396]
·g′a^{L}-gn-∅′	→	·g′a∅°n′	*in·géuin*	Ml69a15
·k°a^{L}-kla-∅′	→	·k°a∅la∅′	*ro·chualae*	Wb5a7

The ending for the third person singular of the reduplicated preterite is consistently /-∅′/. The form *siacht* for the absolute third person singular of saigid ‘approaches, seeks’ is unusual for the t-preterite, as one might expect i-colour there too, although it should be noted that it comes from a latter text.

Table 163. 3rd person singular flexion of the reduplicated preterite: XVX- roots

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
canaid	‘sings’	BI	S1c	XVX-	kan- → ka^{L}-kan-
dingid	‘thrusts, drives in’	BIII	S1d	XVX-	d′əɣ- → d′a^{L}-dəɣ′-
cingid	‘steps’	BI	S1a	XVX-	k′əŋg- → k′a^{L}-k′əŋg-
maidid	‘breaks, bursts’	BII	S2	XVX-	mað′- → m′a^{L}-mað-
gonaid	‘wounds’	BI	S1c	XVX-	g°an- → g′a^{L}-g°ən-
braigid	‘farts’	B	S	XVX-	b′r′aɣ′-[397] → b′a^{L}-braɣ-
as·boind	‘refuses’	BIII	S1d	XVX-	·b°að- → b°a^{L}-b°əð-
oidid	‘lends’	B	S	XVX-	∅°að- → ∅°a^{L}-∅əð-
saigid	‘approaches, seeks’	BI	S1a	XVX-	s′aɣ- → s′a^{L}-saɣ-t-
fichid	‘fights’	BI	S1a	XVX-	·φ′əx → φ′ə∅′x′- → φ′ə∅′x-
ernaid	‘bestows, grants’	BIV	S1d	XVX-	∅′ar → ∅′ə∅′r-
XVX- root					
·ka^{L}-kan-∅′	→	·kaxan′		*ro·cachain*	Ml48b11
k′a^{L}-kaŋg-∅′	→	k′axaŋ′g′		*cechaing*	Fél May 22
·m′a^{L}-mað-∅′	→	·m′aμað′		*ro·mmemaid*	Ml127d6
d′a^{L}-daɣ-∅′	→	d′adaɣ′		*dedaig*	Thes.ii 322.4
·b′a^{L}-brag-∅′	→	·b′aβrəɣ′		*ro·bebraig*	Ferm34b4
g′a^{L}-g°ən-∅′	→	g′ag°ən′		*geguin*	Fél Oct 23
·b°a^{L}-b°əð-∅′	→	·b°aβ°əð′		*at·bobuid*	LU10954
·∅°a^{L}-∅að-∅′	→	·∅°a∅að′		*ro·huaid*	Laws v 368.18

[396] Hull (1964: 319). See also the form *ro·tuil* (leg. *ro·thiuil*) in Thurneysen (1936: 212).
[397] The present tense conjugation of this verb is uncertain.

XVX- root with t-inflexion				
s′a^{L}-say-t-	→	s′ahaxt	*siacht*	LU6259
·s′a^{L}-say-t-	→	·s′ahaxt-	*ro·siacht*	Ml55d2
ī-preterite				
φ′ə∅′x-∅′	→	φ′ə∅′x′	*fich*	LU1542
·∅′ə∅′r-∅′	→	·∅′ə∅′r′	*ro·ír*	Wb17b13

As for the verbs with XVX- roots, one can identify consistently /-∅′/ as the ending of the third person singular of verbs with XV- roots. There are isolated examples of what might be relative forms with the ending /a∅′/, e.g. *dide* (Binchy 1952: 38 §5) from *dinid* 'suckles'.[398] As has been noted above, there is a later tendency for the CCV- roots to be reinterpreted as disyllables, e.g. *ro·giguil* (Rawl 84b55), contrasting with *ro·gíul* (Ml98b8) and the more regularly spelled form *rot·giuil* given above, all third person singular of *glenaid* 'sticks'. The verb *ciid* 'weeps' is also found with a long vowel, e.g. *cích* (LU10964, possibly also Ml16c11), perhaps suggesting variation between a normal reduplicated preterite and an ī-preterite, possibly under the influence of *fichid* 'fights', which has the latter formation. The following table shows examples of the first person plural flexion of the reduplicated preterite.

Table 164. 1st person plural flexion of the reduplicated preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
fichid	'fights'	BI	S1a	XVX-	·φ′əx → φ′ə∅′x′- → φ′ə∅′x-
as·gnin	'recognises'	BV	S3	XV-	·g′n′ə → ·g′a^{L}-gn-
ro·cluinethar	'hears'	BV	S3	XV-	·k°l°ə- → ·k°a^{L}-kla-
CCV- root					
·g′a^{L}-gn-əmr	→	·g′a∅°namar		*ad·genammar*	Wb12d28
·k°a^{L}-kla-əmr	→	·k°a∅lamar		*ro·chualammar*	Wb5a7
ī-preterite					
φ′ə∅′x′-əm′r′	→	φ′ə∅′x′əm′ər′		*fichimmir*	LU10986

The first person plural of the reduplicated preterite regularly takes the ending /-əmr/. The form *fichimmir* (LU10986) is relatively late and points towards confusion with the deponent ending /-əm′r′/. As elsewhere, the suffixless preterite formations do not distinguish absolute from conjunct flexion. The second person plural of the reduplicated preterite are shown in the table below.

[398] On the same page is the form *at·gege*, which is consistent as the third person singular reduplicated preterite of *asa·gú* 'chooses', although this verb is also attested with an s-preterite.

Table 165. 2nd person plural flexion of the reduplicated preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
ro·cluinethar	‘hears’	BV	S3	XV-	·k°l°ə- → ·k°a^{L}-kla-
		CCV- root			
·k°a-kla-əθ′	→	·k°a∅ləθ′		*in-nad·cualaid*	Wb5a21

Examples of the second person plural forms of the reduplicated preterite are, as is often the case, not numerous, but the ending here is as one might expect: /-əθ′/. The third person plural flexion of the reduplicated preterite is shown below.

Table 166. 3rd person plural flexion of the reduplicated preterite

Citation	Meaning	*GOI*	*EIV*	Root shape	Stem
claidid	‘digs’	BI	S1a	XVX-	klað- → k′a^{L}-klað-
as·gnin	‘recognises’	BV	S3	XVX-	·g′n′ə- → ·g′a^{L}-gn-
lenaid	‘remains, attaches to’	BIV	S3	XV-	L′ə- → L′ə^{L}-L
ro·cluinethar	‘hears’	BV	S3	XVX-	·k°l°ə- → ·k°a^{L}-kla-
		XV- root			
L′ə^{L}-L-ədr	→	Ləldar		*leltar*	IT i 12§36
·L′ə^{L}-L-ədr	→	·Ləldar		*ro·leldar*	Ml96c13
·g′a^{L}-gn-ədr	→	·g′a∅°nadar		*at·genatar*	Ériu 2[399]
·k°l°a-kla-ədr	→	·k°a∅ladar		*ro·chualatar*	Wb30a11
		XVX- root			
k′a^{L}-klað-ədr	→	k′axlaðadar		*ro·cechladatar*	Wb5a24

For the third person plural of the reduplicated preterite the ending is /-ədr/. In the form *ro·cechladatar*, third person plural of *claidid* ‘digs’, there is failure to syncopate between /xl/ and /ð/, or, alternatively, one could posit epenthesis to break up an illicit cluster. The form *dia·mbebtar* (ZIHi 52.5) suggests an alternative ending /-dər/, echoing the variation found in the first person plural of the various suffixless preterite formations, as well as that found in the passive third person plural (see 4.3.3).

[399] Stokes (1905b: 102 §10).

Conclusion

This dissertation has dealt with the related questions of consonant colour and vocalism in the history of Irish, focusing particularly on the Old Irish period. In 1.1, the Irish language was introduced and contextualised in terms of its periodisation and genealogy, with essential literature relevant to its historical development identified. In 1.2, the language was viewed through a typological lense, and terminology from the native grammatical tradition was identified, which, it was argued, can contribute to our understanding of prosodic constituency in all periods of Irish. Section 1.3 looked at approaches to the topics of consonant colour and vocalism, first in Old Irish, and then in Modern Irish varieties, identifying some key terminology for the understanding of these aspects of Irish phonology throughout its history.

As the postulate of a minimal vowel system of only two members, /a/ and /ə/, distinguished only by height, is a key feature of the phonological description of Old Irish put forward in this work, a survey of all such systems to be found in the phonological literature was carried out in chapter 2. This constitutes the first time in which minimal vowel systems have been dealt with in a comprehensive and systematic way in the phonological literature, and all relevant examples collated. After terminology relevant to such systems was introduced in 2.1, languages or groups of languages which have been described in terms of a minimal vowel system were discussed in 2.2. It was found that these were spread across a very disperse and geographically disparate range of language families.

Although minimal vowel systems have been described since the earliest days of structuralist lingustics, they have often been poorly understood or ignored in the phonological literature. In 2.3, a synthesis of the main trends to be found among minimal

vowel systems was put forward, and their implications for phonological typology in general, and vowel system modelling in particular, were discussed. In particular, the issue of incommensurability was raised, both incommensurability of phonological symbols, and of phonological descriptions. Various perspectives on phonological modelling were put forward to attempt to resolve some of these problems, and analytical comparanda relevant to the analysis of Old Irish were identified.

Chapter 3 turned to Old Irish, discussing orthography, and then phonology. As regards the former, 3.1 put forward a view of Old Irish phonology in which vowels are systematically used to represent distinctions in consonant colour, which can be viewed as a creative innovation from the Latin model. Permitted ambiguities in Old Irish spelling are given a functional explanation, and assymetries held to point to phonological distinctions, some of which have parallel in Modern Irish. In particular, the notion of "chromatic transition" was introduced (de Búrca 1978), with a gradual leftwards shift in the location of the chromatic transition through the history of the language held to account not just for much historical development, but also for a considerable proportion of the contemporary dialect variation with regard to consonant colour and vocalism.

Static aspects of Old Irish phonology were outlined in 3.2. Perspectives from phenomenology and Cognitive Linguistics were introduced favouring a phonological model based on the notion of image schemata (Johnson 1987). The image schemata adopted in this work were then presented. One image schema, *process*, captures the perceptually linear nature of speech, corresponding broadly to what Saussure (1916) referred to as the "acoustic chain". The *path* image schema was invoked to describe the fact that numerous acoustic cues together serve to identify certain functional distinctions. This was shown to also enable the model to accommodate many insights of autosegmental and Firthian phonology. The *cycle* image schema was presented as a single recursion of acoustic cues hierarchically grouped on given paths, with the intersection of cycle and path termed a *node*. Scalar *percepts* indexed to paths incorporate functionally relevant phonological contrasts, with the percept occurring at a given node termed a *specification*. From the variable specification of given paths in a single cycle, natural classes of consonants emerge, and the consonants and vowels found in Old Irish were described according to these representational principles.

The dynamic aspects of Old Irish phonology were the topic of 3.3. The phenomenon of initial consonant mutation was given a brief introduction in terms of typological

parallels and terminological concerns, and was shown to involve morphosyntactically conditioned deletion or assimilation of specifications on given paths. The important phenomena of syncope, vowel epenthesis, and consonant were then introduced, followed by a survey of the different types of assimilation to be found in Old Irish.

Chapter 4 discussed the Old Irish verbal system. In 4.1, key terminology relevant to the Old Irish verbal system was established, and the workings of the system in terms of the model of prosodic constituency presented in 1.2 set out. It was shown that the Old Irish verb distinguishes what can be termed a *prenuclear constitutent*, from a *nuclear constituent*. These were covered in more detail in the following sections. In 4.2, the structure of the prenucelar constituent was laid out, with special attention paid to the question of stress on the one hand, and the issue of preverb allomorphy on the other. In 4.3, the nuclear constituent was discussed, with the various root shapes occurring in Old Irish, patterns of stem formation, and allomorphy of person endings discussed one by one. These preliminaries laid the ground for the empirical description of the principal Old Irish stem formations in chapters 5 and 6.

Old Irish present stem flexion was the topic of chapter 5. Active flexion was discussed in 5.1, with separate subsections dealing with weak verbs, strong verbs without a nasal infix, nasal presents, and hiatus verbs, followed by a discussion of passive flexion in 5.2. Chapter 6 focused on the other stem formations, beginning with the subjunctive formations in 6.1, before proceeding to the future in 6.2, and the preterite in 6.3.

In chapters 5 and 6, for each person and number of each tense formation, examples were found from Old and Middle Irish texts. All verbal forms were listed according to their citation form, their meaning, their classification in the main existing secondary sources (*GOI*; *EIV*), their root shape, and their stem formation. Each individual form was shown first as a string of morphemes and then as a surface phonological form after the relevant phonological and, in the case of mutation also morphosyntactic, operations, along with the orthographic form and the citations. Orthographic variation and irregularities are openly discussed.

These chapters will be a valuable resource for future studies of the Old Irish verbal system. However, they also constitute an attempt to justify the phonological system posited here for Old Irish, and an empirical test of its parsimony. Whether they have succeeded or not can be judged by the reader. I only hope that, even in some little ways, this work has brought some tractability to its subject matter.

Summary

This dissertation deals with the related questions of consonant colour and vocalism in the history of Irish, focusing particularly on the Old Irish period. It argues that Old Irish had three distinct series of consonant colour, and a vertical vowel system of only two members. This position is defended typologically, by means of a comprehensive survey of minimal and vertical vowel systems in the cross-linguistic literature, and also empirically, through a detailed description of Old Irish verbal morphology in terms of a phonological system with three consonant colours and only two vowels.

There is a pervasive contrast in consonant colour, also known as consonant quality, or secondary articulation, throughout the history of the Irish language, but scholars have disagreed on the number of distinct consonant colours which need to be posited for earlier stages of the language. Early twentieth century approaches described three distinct series of consonant colour, with a short vowel system of five members, while later work put forward a two-way contrast in consonant colour alongside eight short vowels. However, in recent years, a number of scholars have arguing for a return to the earlier view, sometimes in the context of a vertical short vowel system of two members.

The impetus to describe Old Irish in terms of a vertical vowel system comes from a changing understanding of Modern Irish phonology. While the traditional dialect descriptions from the middle of the century describe Modern Irish dialects as having vowel systems of five or six members, it was recognised from the 1960s onwards that the front and back members of these systems were actually in complementary distribution, conditioned by the colour of surrounding consonants.

In order to contextualise the arguments for the existence of a vertical vowel system in the Irish language, and to uncover useful analytical comparanda for the descrip-

tion of Old Irish, a comprehensive survey of vertical vowel systems described in the linguistic literature is carried out in this thesis. Although the existence of such systems has been acknowledged since the early days of structuralist linguistics, this is the first time that all of the relevant examples have been drawn together and discussed, and thus constitutes a contribution to the phonological typology literature. This survey of vertical and minimal vowel systems furnishes useful comparanda for the description of Irish phonology. In particular, analysing long vowels as combinations of short vowel and glide drastically simplifies the statement of vowel alternations in a number of morphological forms in Old Irish.

The Old Irish phonological system is described here in terms of percepts indexed to hierarchically organised clusters of acoustic cues. The phenomenon of consonant mutation can be described in terms of loss or gain of specification at certain points in the hierarchy. Syncope regularly deletes every second, non-final vowel, while vowel epenthesis repairs illicit clusters of consonants, and consonant excrescence repairs illicit clusters of vowels. Assimilation of both laryngeal features and consonant colour interact with these phenomena.

A description of the Old Irish verbal system is put forward to show the advantages of the posited phonological system. It is suggested that some of the complexities of the Old Irish verb can best be modelled by the adaption and formalisation of insights of the traditional Irish grammarians, who identified a type of prosodic hierarchy for Classical Irish, which can be modified to suit Old Irish.

Based on this system, the inflexion of the Old Irish verb is explored in terms of a three-way distinction in consonant colour and two-member vowel system. The Old Irish verb distinguishes five stem formations, for the present, subjunctive, future, preterite, and preterite passive, as well as active, deponent and passive flexion for most of these. These are dealt with in turn, and examples shown for person and number in each case.

This constitutes an important contribution to the study of the Old Irish verb in two respects. Firstly, the phonological system posited allows many patterns to be stated in a more regular fashion, so that a number of supposed irregularities are shown to be regular, and leading to a more streamlined statement of the language's verbal morphology. Secondly, the collation and careful study of specific examples from Old Irish texts mean that this work can serve as a point of reference for future studies into the Old Irish verb.

Streszczenie

Niniejsza praca poświęcona jest związanym ze sobą kwestiom barwienia spółgłosek i wokalizmu w historii języka Irlandzkiego, ze szczególną uwagą na okres staro-irlandzki. Głównym twierdzeniem pracy jest to, że język staro-irlandzki miał trzy odrębne serie spółgłosek, polegających na barwieniu, oraz minimalny (wertykalny) system samogłosek składający się z dwóch tylko komponentów. Obrona głównego twierdzenia ma podwójny charakter: empiryczny i typologiczny. Część typologiczna bazuje na kompleksowym przeglądzie minimalnych systemów samogłosek w językach świata. Część empiryczna oparta jest na opisie morfologii czasownika staro-irlandzkiego, w którym występują trzy barwy spółgłoskowe, ale tylko dwie samogłoski.

W historii języka irlandzkiego znajdziemy wszechobecny kontrast w barwieniu spółgłosek, znany również pod hasłem jakości czy artykulacji podwójnej, natomiast w literaturze jest brak zgody dotyczącej ilości barwienia w wcześniejszych etapach historii języka. Najwcześniejsze opisy z wieku dwudziestego bazują na trzech odrębnych barwach, z systemem pięciu samogłosek. Późniejsi autorzy proponowali podwójny system spółgłosek z ośmioma samogłoskami. W ostatnich latach, niektórzy popierają powrót do starszej perspektywy.

Motywację opisywania języka staro-irlandzkiego jako minimalny system samogłosek stanowi nowa wiedza na temat fonologii współczesnego języka irlandzkiego. Od lat sześćdziesiątych ubiegłego stulecia już wiadomo, że w wielu dialektach, w których zakładano systemy pięcio- czy sześcio-samogłoskowe, przednie i tylne samogłoski znajdują się w dystrybucji komplementarnej, czyli przednia czy tylna pozycja języka w samogłosce jest przewidywalna, w zależności od poprzedzających czy następujących spółgłosek.

Celem kontekstualizacji argumentów popierających twierdzenia minimalnego systemu samogłosek w języku irlandzkim, w niniejszej pracy dokonano kompleksowy przegląd minimalnych (wertykalnych) systemów samogłoskowych w językach świata. Mimo że istnienie takich systemów znane jest od czasów językoznawstwa strukturalistów, niniejsza praca zawiera pierwszy wspólny opis razem z dyskusją wszystkich takich systemów, dzięki czemu stanowi istotny wkład do typologicznej literatury fonologicznej. Przegląd ten dostarcza punktów porównawczych w opisie fonologii irlandzkiego. Analiza długich samogłosek jako sekwencja krótkiej samogłoski i spółgłoski półotwartej w dramatyczny sposób upraszcza opis alternacji samogłosek w wielu formach morfologicznych w języku staro-irlandzkiego.

System fonologiczny języka staro-irlandzkiego opisany jest w niniejszej pracy jako hierarchii cech akustycznych. Zjawisko mutacji spółgłosek da się w ten sposób opisać jako utrata lub dodawanie danej cechy w danej pozycji w hierarchii, natomiast w synkopie obserwujemy elizję co drugiej samogłoski (z wyjątkiem końca wyrazu), a epenteza rozdziela zbitki spółgłoskowe czy nielegalne sekwencje samogłosek. W wszystkich tych zjawiskach znajdziemy również asymilację barwienia spółgłoskowego oraz cech krtaniowych.

Niniejsza praca dostarcza opisu systemu czasownikowego języka staro-irlandzkiego, aby zilustrować zalety przyjętych założeń fonologicznych. Podsuwa się argument, że zawiłości w czasowniku staro-irlandzkiego najlepiej opisać poprzez formalizację perspektywy tradycyjnych gramatyków irlandzkich, którzy proponowali pewnego rodzaju hierarchię prozodyczną. Czasownik staro-irlandzki opisany jest w ramach potrójnego systemu barwienia spółgłoskowego razem z minimalnym systemem dwóch samogłosek. W czasowniku staro-irlandzkim jest pięć różnych typów rdzenia – dla czasu teraźniejszego, trybu łączącego, czasu przyszłego, czasu przeszłego dokonanego (również w stronie biernej), oraz fleksja aktywna, świadcząca, i bierna dla większości tych rdzeni. W rozdziałach empirycznych podano przykłady wszystkich tych typów czasownika razem z fleksją.

Niniejsza praca stanowi ważny wkład do literatury dotyczącej czasowniku staro-irlandzkiego z dwóch względów. Po pierwsze, zaadoptowany system fonologiczny pozwala na bardziej systematyczny opis wielu aspektów morfologicznych, dzięki czemu nieregularności stają się regularnościami. Po drugie, zestawienie oraz szczegółowy opis danych przykładów z tekstów staro-irlandzkich stanowią cenny punkt wyjścia dla dalszych badań na temat czasownika staro-irlandzkiego.

References: primary literature

Atkinson, Robert (ed.). 1880. *The book of Leinster: Sometimes called the Book of Glendalough : a collection of pieces, prose and verse, in the Irish language, compiled in part, about the middle of the twelfth century: Now for the first time published from the original manuscript in the library of Trinity College, Dublin, by the Royal Irish Academy*. Dublin: Royal Irish Academy.

Atkinson, Robert (ed.). 1896. *The yellow book of Lecan: A collection of pieces (prose and verse) in the Irish language, in part compiled at the end of the fourteenth century*. Dublin: Royal Irish Academy.

Bergin, Osborn (ed.). 1916. "Irish grammatical tracts [I and II, §§ 1–11]", *Ériu* 8 supplement: i-v, 1-60.

Bergin, Osborn (ed.). 1923. "Irish grammatical tracts [II, §§ 12–87]", *Ériu* 9 supplement: 61-124.

Bergin, Osborn (ed.). 1928. "Irish grammatical tracts [II, §§ 88–207]", *Ériu* 10 supplement: 125-166.

Bergin, Osborn (ed.). 1946. "Irish grammatical tracts: III and IV", *Ériu* 14 supplement: 167-257.

Bergin, Osborn (ed.). 1955. "Irish grammatical tracts V: Metrical faults", *Ériu* 17 supplement: 259-293.

Binchy, Daniel (ed.). 1938. "Bretha Crólige", *Ériu* 12: 1-77.

Binchy, Daniel (ed.). 1952. "The Saga of Fergus Mac Léti", *Ériu* 16: 33-48.

Byrne, Mary (ed.). 1905. "A Prayer", *Ériu* 2: 89-91.

Calder, George (ed.). 1917. *Auraicept na n-éces: The scholars' primer, being the texts of the Ogham tract from the Book of Ballymote and the Yellow book of Lecan, and the text of the Trefhocul from the Book of Leinster*, Edinburgh: John Grant.

Carey, John (ed.). 2000. "Téacsanna Draíochta, Éirinn sa Mheánaois Luath", *Léachtaí Cholm Cille* 30: 98-117.

Carney, James (ed.). 1958. "Two Old Irish poems", *Ériu* 18: 1-43.

Dillon, Myles (ed.). 1952. "The story of the finding of Cashel", *Ériu* 16: 61-73.

Ferguson, Samuel, Eugene O'Curry, and Brian O'Looney (eds.). 1876. *Leabhar breac, the Speckled book, otherwise styled Leabhar mór dúna doighre, the Great book of dún doighre; a collection of pieces in Irish and Latin, comp. from ancient sources about the close of the fourteenth century: Now for the first time published from the original manuscript in the library of the Royal Irish academy*. Dublin: Royal Irish Academy.

Gwynn, E. J (ed.). 1942. "Privileges and responsibilities of poets", *Ériu* 13: 1-60.

Gwynn, E. J. and Walter J. Purton (eds.). 1912. "The monastery of Tallaght", *Proceedings of the Royal Irish Academy* 29c: 115-179.

Gwynn, Edward John (ed.). 1903-35. *The Metrical dindsenchas*. Dublin: Dublin Institute of Advanced Studies.

Gwynn, Lucius (ed.). 1915. "The Reliquary of Adamnán", *Archivium Hibernicum* 4: 119-214.

Hancock, W. Neilson, Thaddeus O'Mahony, Alexander George Richey and Robert Atkinson (eds.). 1865-1901. *Ancient laws of Ireland*, 6 vols. Dublin: Stationery Office.

Hull, Vernam (ed.). 1964. "Varia Hibernica", ZCP 29: 315-24.

Knott, Eleanor (ed.). 1936. *Togail bruidne Da Derga*. Dublin: Stationery Office.

Macalister, R. A. S (ed.). 1945. *Corpus inscriptionum insularum celticarum Vol. I*. Dublin: Stationery Office.

Macalister, R. A. S (ed.). 1949. *Corpus inscriptionum insularum celticarum Vol. II*. Dublin: Stationery Office.

Macalister, Robert (ed.). 1916. *Leabhar gabhála, the book of conquests of Ireland: the recension of Micheál Ó Cléirigh part 1*. Dublin: Hodges and Figgis.

McKenna, Lambert (ed.). 1944. *Bardic syntactical tracts: edited by Lambert McKenna, S. J*. Dublin: the Dublin institute for advanced studies.

Merriman, Brian [n.d.] (1999). *Cúirt an mheán-oíche*. [The midnight court]. (Translated by Patrick C. Power). Dublin: Mercier.

Meyer, Kuno (ed.). 1894. *Hibernica minora: Being a fragment of an Old-Irish treatise on the psalter, with translation, notes and glossary, and an appendix containing extracts hitherto unpublished from ms. Rawlinson B. 512, in the Bodleian library*. Oxford: Clarendon Press.

Meyer, Kuno (ed.). 1895. *The voyage of Bran Son of Febal to the land of the living*. London: David Nutt in the Strand.

Meyer, Kuno (ed.). 1899. "Stories and songs from Irish MSS", *Otia Mersiana* 1: 113-28.

Meyer, Kuno (ed.). 1901. "The expulsion of the Dessi", *Y Cymmrydor* 14: 101-35.

Meyer, Kuno (ed.). 1902. *Liadain and Curithir, an Irish love-story of the ninth century*. London: D. Nutt.

Meyer, Kuno (ed.). 1905. *Cáin Adamnáin an Old-Irish treatise on the law of Adamnan*. Oxford: Clarendon Press.

Meyer, Kuno (ed.). 1907. "A medley of Irish texts", *Archiv für Celtisches Lexicographie* 3: 303-26.

Meyer, Kuno (ed.). 1909. *Rawlinson B. 502: A collection of pieces in prose and verse in the Irish language, compiled during the eleventh and twelfth centuries. Now published in facsimile from the original manuscript in the Bodleian Library, with an introduction and indexes by Kuno Meyer*. Oxford: Clarendon.

Meyer, Kuno (ed.). 1910. "Altirische Reimsprüche", ZCP 7: 268-9.

Meyer, Kuno (ed.). 1912a. "Mitteilungen aus irischen Handschriften", ZCP 8: 195-232.

Meyer, Kuno (ed.). 1912b. "The Laud genealogies and tribal histories", ZCP 8: 291-338.

Meyer, Kuno (ed.). 1912c. "The march roll of the men of Leinster", *Ériu* 6: 121-4.

Meyer, Kuno (ed.). 1913. "Baile Bricrín", ZCP 9: 449-457.

Meyer, Kuno (ed.). 1913. *Über die älteste irische dichtung*. Berlin: Verlag der Königlich akademie der wissenschaften.

Meyer, Kuno (ed.). 1916. "Maelduins Meerfahrt, ein altirisches Gedicht", ZCP 11: 148-165.

Meyer, Kuno (ed.). 1921. "Mitteilungen aus irischen Handschriften", ZCP 13: 3-30.

O'Grady, Standish H. (ed.). 1892. *Silva gadelica*. London: Williams and Norgate.

O'Keefe, J. G (ed.). 1910. "Cáin Domnaig", *Anecdota from Irish Manuscripts* 3: 21-7.

O'Keefe, John (ed.). 1905. "Cáin Domnaig", *Ériu* 2: 189-214.

O'Longan, Joseph (ed.). 1870. *Leabhar na h-Uidri: A collection of pieces in prose and verse, in the Irish language*. Dublin: Royal Irish Academy.

Plummer, Charles (ed.). 1922. *Bethada náem nÉrenn*. Oxford: Clarendon Press.

Stern, Ludwig Christian (ed.). 1910. "Altirische Glossen zu dem Trierer Enchiridion Augustins, der Königlichen Bibliothek zu Berlin", ZCP 7: 475-497.

Stokes, Whitley (ed.). 1877. *Three Middle-Irish homilies on the lives of saints Patrick, Brigit and Columba*. Calcutta.

Stokes, Whitley (ed.). 1887. *The tripartite life of Patrick, with other documents relating to that Saint*. London: Eyre and Spottiswoode.

Stokes, Whitley (ed.). 1889. "The Voyage of Mael Duin", *Revue Celtique* 10: 50-95.

Stokes, Whitley (ed.). 1891. "Cath Maige Tured", RC 12: 52-130.

Stokes, Whitley (ed.). 1900. "O'Mulconry's glossary", *Archiv für celtische Lexikographie* 1: 232–324, 473–481.

Stokes, Whitley (ed.). 1901a. "The Battle of Carn Conaill", ZCP 3: 203-219.

Stokes, Whitley (ed.). 1901b. "Amra Senáin", ZCP 3: 220-225.

Stokes, Whitley (ed.). 1905. *Félire Óengusso Céli Dé: The Martyrology of Oengus the Culdee*. London: Harrison and sons.

Stokes, Whitley (ed.). 1905b. "The Evernew Tongue", *Ériu* 2: 96-162.

Stokes, Whitley and John O'Donovan (eds.). 1868. *Sanas Chormaic: Cormac's glossary*. Calcutta: O.T. Cutter.

Stokes, Whitley, and John Strachan (eds.). 1903. *Thesaurus palaeohibernicus: a collection of Old-Irish glosses, scholia, prose, and verse*, 3 vols., vol. 2: *Non-Biblical glosses and scholia; Old-Irish prose; names of persons and places; inscriptions; verse; indexes*. Cambridge: Cambridge University Press.

Stokes, Whitley, and John Strachan (eds.). 1901. *Thesaurus palaeohibernicus: a collection of old Irish glosses ; scholia, prose, and verse*, 3 vols., vol 1: *Biblical glosses and scholia*. Cambridge: Cambridge University Press.

Strachan, John (ed.). 1904. "An Old Irish metrical rule" *Ériu* 1: 191-208.

Strachan, John (ed.). 1907. "An Old Irish homily", *Ériu* 3: 1-10.

Strachan, John, and J. G. O'Keeffe (eds.). 1912. *The Táin Bó Cúailnge from the Yellow Book of Lecan: With variant readings from the Lebor na Huidre*. Dublin and London: Royal Irish Academy.

Thurneysen, Rudolf (ed.). 1917. "Morands Fürstenspiegel", ZCP 11: 56-106.

Thurneysen, Rudolf (ed.). 1918. "Zu Irischen Texten", ZCP 12: 398-407.

Thurneysen, Rudolf (ed.). 1921. "Grammatisches und Etymologisches", ZCP 13: 101-8.

Thurneysen, Rudolf (ed.). 1936. "Zur Seitenfüllung", ZCP 20: 212 .

Thurneysen, Rudolf and Williams, Ifor (eds.). 1940. "Irische und brittanische Glossen", ZCP 21: 280-306.

Windisch, Ernst (ed.). 1905. *Die altirische heldensage, Táin Bó Cúalnge*. Leipzig: von Hirzel.

References: secondary literature

Adams. G.B. 1970. “Grammatical Analysis and Terminology in the Irish Bardic Schools”, *Folia Linguistica* 4: 157-166.

Ahlqvist, Anders. 1974. “Notes on ‘case’ and word boundaries”, *Ériu* 35: 181-189.

Ahlqvist, Anders. 1994. “Litriú na Gaeilge” [Irish spelling], in: Kim McCone and Pádraig Ó Fiannachta (eds.), *Stair na Gaeilge in ómós do Pádraig Ó Fiannachta* [History of Irish in homage to Pádraig Ó Fiannachta] Maigh Nuad: Roinn na Sean-Ghaeilge, Coláiste Phádraig, 23-60.

Aikhenwald, Alexandra. 2008. *The Manambu language of East Sepik, Papua New Guinea*. Oxford: Oxford University Press.

Al-Rashdan, Bashar. 2008. “Firthian prosodic approach: Evidence from Arabic”, *Jordan Journal of Modern Languages and Literature* 1: 23-41.

Al-Tamimi, Jalal-Eddin and Emmanuel Ferragne. 2005. “Does vowel space size depend on language vowel inventories? Evidence from two Arabic dialects and French.”, *Proceedings of Interspeech 2005 - Eurospeech: 9th European Conference on Speech Communication and Technology, Lisbon, Portugal*: 2465-2468

Allen, Janice D. and Phyllis W. Hurd. 1972. “Manambu phonemes”, *Te Reo* 15: 37-44.

Allen, W. S. 1956. “Structure and system in the Abaza verbal complex”, *Transactions of the Philological Society* 55: 127–176.

Allen, W. S. 1965. “On one-vowel systems”, *Lingua* 13.2: 111-124.

Anderson, Cormac and Sylwester Jaworski. 2015. “The phonetics and phonology of rhotics in Modern Irish”, in: Johnson, Dafydd, Elena Parina and Maxim Fomin (eds.), ‘*Yn llawen iawn*, *yn llawn iaith*’*: Proceedings of the 6th International*

Colloquium of Societas Celto-Slavica. Aberystwyth: University of Wales Press, 193-212.

Anderson, Cormac. 2009. A survey of the digraphs vowel + i in the Würzburg and Milan glosses. [Unpublished MA dissertation, National University of Ireland, Galway].

Anderson, Cormac. 2012. "How English is Irish? The typology of Irish initial consonant clusters", in: Jaskuła, Krzysztof (ed.), *Formal and historical approaches to Celtic linguistics*. Lublin: Wydawnictwo KUL, 13-33.

Anderson, Cormac. 2013. "The frequency of Irish consonants: *Bunreacht na hÉireann* as a case study", in: Jaskuła, Krzysztof and Wojciech Malec (eds.), *Linguistic meetings across borders*. Zamość: Państwowa Wyższa Skoła Zawodowa, 11-24.

Anderson, Cormac. 2014a. "Consonant quality in Old Irish revisited", in: Roma, Elisa and David Stifter (eds.), *Linguistic and philological studies in Early Irish*. Lewiston: Edwin Mellen Press, 1-30.

Anderson, Cormac. 2014b. "Consonant quality in Old Irish revisited", *Res Celticae* 1: 9-44.

Anderson, Cormac. 2015a. Celtic geminates in cross-linguistic perspective (Paper presented at the International Congress of Celtic Studies, Glasgow, 13-17 July, 2015).

Anderson, Cormac. 2015b. What, if anything, is a phoneme? (Paper presented at the International Congress of Cognitive Linguistics, Newcastle, 20-25 July, 2015).

Anderson, John R. 1991. "Kabardian disemvowelled again", *Studia Linguistica* 45.1: 18-48.

Anderson, Stephen R. 1978. "Syllables, segments and the Northwest Caucasian languages", in: Bell, Alan and Joan B. Hooper (eds.), *Syllables and segments*. Amsterdam: North Holland Publishing Company, 47-58.

Ascoli, Graziadio Isaia. 1891. "Sulle vocali attrate nell'irlandese" [On attracted vowels in Irish], *Archivio Glottologico Italiano, Supplementi Periodici* 1: 73-6.

Backley, Phillip. 1993. "Coronal: The undesirable element", *UCL Working Papers in Linguistics* 5: 301-323.

Backley, Phillip. 2011. *An introduction to Element Theory*. Edinburgh: Edinburgh University Press.

Bagemihl, Bruce. 1989. Syllable structure in Bella Coola. (Paper given at North Eastern Linguistics Society 20, University of Massachussets, Amherst).

Bagemihl, Bruce. 1991. "Syllable Structure in Bella Coola", *Linguistic Inquiry* 22: 589-646.

Bagemihl, Bruce. 1998. "Maximality in Bella Coola (Nuxalk)", in: Czaykowski-Higgins, Ewa and M. Dale Kinkade, *Salish languages and linguistics: Theoretical and descriptive perspectives*. Berlin: Mouton de Gruyter, 71-98.

Baker, Gary Kenneth. 2004. Palatal phenomena in Spanish Phonology. [Unpublished PhD dissertation, University of Florida].

Banksira, Degif Petros. 2000. *Sound mutations: The morphophonology of Chaha*. Philadelphia: John Benjamins.

Baroni, Antonio. 2011. "Alphabetic vs. non-alphabetic writing systems: Linguistic fit and natural tendencies", *Rivista di Linguistica* 23.2: 127-159

Barreteau, Daniel and Hermann Jungraithmayr. 1982. "Le verbe en sibine", in: Jungraithmayr, Herrmann (ed.), *The Chad languages in the Hamitosemitic-Nigritic border area: Papers of the Marburg Symposion, 1979*. Berlin: D. Reimer, 192-229.

Barreteau, Daniel. 1983. "Phonémique et prosodie en Higi", in: Wolff, Ekkehard and Hermann Mayer-Bahlberg (eds.), *Studies in Chadic and Afroasiatic Linguistics*. Hamburg: H. Buske Verlag, 249-276.

Barreteau, Daniel. 1987. "Du vocalisme en tchadique", in: Barreteau, Daniel (ed.), *Langues et cultures dans le bassin du lac Tchad*. Paris: ORSTOM, 161-91.

Barreteau, Daniel. 1988. *Description du Mofu-Gudur: Langue de la famille tchadique parlée au Cameroun. Livre 1: Phonologie*. Paris: Orstrom.

Bauer, Bernhard and Stefan Schumacher. 2014. *The online database of the Old Irish Priscian glosses*. Institut für Sprachwissenschaft, Universität Wien. Online at http://www.univie.ac.at/indogermanistik/priscian/.

Baumgarten, Rolf and Sommerfelt, Alf. 1971. "Alf Sommerfelt's Proposals for an Irish Linguistic Survey", *Studia Hibernica* 14: 124-139.

Baxter, William H. 1992. *A handbook of Old Chinese phonology*. Berlin: Mouton.

Bellem, Alex. 2007. Towards a comparative typology of emphatics: Across Semitic and into Arabic dialect phonology [Unpublished PhD dissertation, School of Oriental and African Studies, University of London].

Bender, Byron W. 1968. “Marshallese phonology”, *Oceanic Linguistics* 7: 16-35.

Beneviste, Émile. 1935. *Origines de la formation des noms en indo-européen*. Paris: Adrien Maisonneuve.

Bennett, Ryan, Grant McGuire, Máire Ní Chiosáin and Jaye Padgett. 2014. An ultra-sound study of Connemara Irish palatalisation and velarization. [Unpublished ms.]

Bergin, Osborn. 1907. “Palatalization”, *Ériu* 3: 50-91.

Bergin, Osborn. 1928a. “ar-neut, in-neuth”, *Ériu* 10: 111.

Bergin, Osborn. 1928b. “Old Irish -tuit”, *Ériu* 10: 193.

Bergin, Osborn. 1935. “The 2sg. Absolute of Berid”, *Ériu* 12: 135.

Bergin, Osborn. 1938a. “On the syntax of the verb in Old Irish”, *Ériu* 12: 197-214.

Bergin, Osborn. 1938b. “Varia I (21)”, *Ériu* 12: 227-229.

Bergin, Osborn. 1938c. “Miscellanea”, *Ériu* 12: 135-136.

Biber, D. 1988. *Variation across speech and writing*. Cambridge: Cambridge University Press.

Blench, Roger and Ndamsai, Antony. 2007. “Introduction to Kirya-Konzəl”, *Topics in Chadic Linguistics* 5: 76-85.

Blench, Roger. 2009. Bura Phonology and some suggestions concerning the orthography. (http://www.rogerblench.info/Language/Afroasiatic/Chadic/Central/Bura/Bura%20opening%20page.htm) (date of access: 31 Dec. 2013).

Blevins, Juliette and Andrew Pawley. 2010. “Typological implications of Kalam predictable vowels”, *Phonology* 27.1: 1-44.

Blevins, Juliette. 2001. “Where have all the onsets gone? Initial consonant loss in Australian Aboriginal languages”, in: Simpson, Jane, David Nash, Mary Laughren, Peter Austin, and Barry Alpher (eds.), *Forty years on: Ken Hale and Australian languages*. Canberra: Pacific Linguistics, 481-492.

Bliss, A. 1972. “Languages in contact: Some problems of Hiberno-English”, *Proceedings of the Royal Irish Academy* 72: 63-82 .

Bloch-Rozmej, Anna. 1998. *Element interactions in phonology*. A study in Connemara Irish. Lublin: Redakcja Wydawnictw KUL.

Blumstein, Sheila E. and Kenneth N. Stevens. 1979. “Acoustic invariance in speech production: Evidence from measurements of the spectral characteristics of stop consonants”, *Journal of the Acoustic Society of America* 66.4: 1001-1017.

Boas, Franz. 1889. “On alternating sounds”, *American Anthropologist* 2: 47-54.

Boas, Franz. 1911. “Introduction”, in: Boas, Franz. *Handbook of American Indian languages*. Washington: G.P.O.

Boer, Bart de. 1999. Self-organisation in vowel systems [Unpublished PhD dissertation, Free University of Brussels].

Boersma, Paul and Silke Hamann. 2008. “The evolution of auditory dispersion in bidirectional constraint grammars”, *Phonology* 25: 217-270.

Boersma, Paul. 1998. *Functional phonology: Formalizing the interactions between articulatory and perceptual drives*. The Hague: Holland Academic Graphics.

Bopp, Franz. 1839. *Die Celtischen Sprachen in ihrem Verhältnisse zum Sanskrit, Zend, Griechischen, Lateinischen, Germanischen, Litthauischen und Slawische*. Berlin: Ferdinand Dümmler.

Borgstrøm, Carl. 1954a. Review of *Preliminaries to speech analysis: The distinctive features and their correlates* by Roman Jakobson, Gunnar Fant and Morris Halle, *Norsk Tidsskrift for Sprogvidenskap* 17: 549-558.

Borgstrøm, Carl. 1954b. “Internal reconstruction of pre-Indo-European word forms”, *Word* 10: 275-287.

Borgstrøm, Carl. 1974. “On the influence of Norse on Scottish Gaelic”, *Lochlann* 6: 91-107.

Bouquiaux, Luc. 1970. *La langue birom (Nigeria septentrional): Phonologie, Morphologie, Syntaxe*. Paris: Les Belles Lettres.

Bow, Catherine. 1997a. *Labialisation and palatalisation in Moloko*. Yaoundé: SIL.

Bow, Catherine. 1997b. *A description of Moloko phonology*. Yaoundé: SIL.

Bow, Catherine. 1999. The Vowel System of Moloko. [Unpulished MA Dissertation, University of Melbourne].

Breatnach, Risteard B. 1947. *The Irish of Ring, Co. Waterford: A phonetic study*. Dublin: Dublin Institute for Advanced Studies.

Breen, Gavan and Rob Pensalfini. 1999. “Arrernte: A language with no syllable onsets”, *Linguistic Inquiry* 30.1: 1-25.

Breen, Gavan. 1977. “Andegerebenha Vowel Phonology”, *Phonetica* 34: 371-391.

Breen, Gavan. 2001. “The wonders of Arandic phonology”, in: Simpson, Jane, David Nash, Mary Laughren, Peter Austin, and Barry Alpher (eds.), *Forty years on: Ken Hale and Australian languages*. Canberra: Pacific Linguistics, 45-69.

Broderick, George. 1984–86. *A handbook of late spoken Manx*. Tübingen: Niemeyer.

Browman, Catherine P. and Louis Goldstein. 1992. “Articulatory phonology: An overview”, *Phonetica* 49: 155-180.

Butcher, Andrew and Anderson, Victoria. 2008. “The vowels of Australian Aboriginal English”, in *Proceedings of Interspeech 2008: 9th Annual Conference of the International Speech Communication Association, 22-26 September 2008, Brisbane, Australia*: 347-350.

Butcher, Andrew. 1994. “On the phonetics of small vowel systems: Evidence from Australian languages”, in: Togneri, R. (ed.), *Proceedings of the 5th Australian International Conference on Speech Science and Technology*. Canberra: Australian Speech Science and Technology Association, 28-33.

Butcher, Andrew. 2006. “Australian Aboriginal languages: Consonant-salient phonologies and the ‘place-of- articulation imperative’”, in: Harrington, Jonathan and Marija Tabain (eds.), *Speech production: Models, phonetic processes and techniques*. New York: Psychology Press, 187-210.

Butcher, Andrew. 2012. “On the phonetics of long, thin phonologies”, in: Donohue, Cathryn, Shunichi Ishihara, William Steed, and Philip Rose (eds.), *Quantitative approaches to problems in linguistics: Studies in honour of Phil Rose*. München: Lincom Europa, 133-54.

Bybee, Joan. 2001. *Phonology and language use*. Cambridge: Cambridge University Press.

Card, E. 1983. A phonetic and phonological study of Arabic emphasis. [Unpublished doctoral dissertation, Cornell University, Ithaca, USA].

Carnie, Andrew, and Eithne Guilfoyle (eds.). 2000. *The Syntax of the verb initial languages*. New York: Oxford University Press.

Carnie, Andrew, Sheila Ann Dooley, and Heidi Harley (eds.). 2005. *Verb first: On the syntax of verb-initial languages*. Amsterdam: John Benjamins.

Carré René. 2002. “Émergence des systèmes phonologiques”, *Langages* 146: 70-79.

Carvalho, Joaquim Brandão de. 2005. “Building on old foundations : From phonemic theory to C/V-segregation”, *Folia linguistica* 39: 363-384.

Catford, John C. 1977. *Fundamental problems in phonetics*. Bloomington: Indiana University Press.

Chao, Yuen Ren. 1934. "The non-uniqueness of phonemic solutions of phonetic systems", *Bulletin of the Institute of History and Philology, Academia Sinica* 4.4: 363-397.

Chao, Yuen Ren. 1968. *A grammar of spoken Chinese*. Berkeley: University of California Press.

Charette, Monik and Göksel, Aslı. 1998. "Licensing constraints and vowel harmony in Turkic languages", in: Cyran, Eugeniusz (ed.), *Structure and interpretation: studies in phonology*. Lublin: Folium, 65-88.

Charette, Monik. 2006. "The end of the (Turkish) word", *SOAS Working Papers in Linguistics* 14: 23-40.

Cheng, Chin-Chuan. 1973. *A synchronic phonology of Mandarin Chinese*. The Hague: Mouton.

Choi, John D. 1991. "An acoustic study of Kabardian vowels", *Journal of the International Phonetic Association* 21.1: 4-12.

Choi, John D. 1992. "Phonetic Underspecification and Target Interpolation: An Acoustic Study of Marshallese Vowel Allophony", *UCLA Working Papers in Phonetics* 82.

Choi, John D. 1995. "An acoustic-phonetic underspecification account of Marshallese vowel allophony", *Journal of Phonetics* 23: 323-347.

Chomsky, Noam and Halle, Morris. 1965. "Some controversial questions in phonological theory", *Journal of Linguistics* 1.2: 97-138.

Chomsky, Noam and Halle, Morris. 1968. *The sound pattern of English*. New York: Harper and Row.

Chomsky, Noam. 1959. Review of *Verbal Behavior* by B. F. Skinner, *Language*, 35.1: 26-58.

Chudak, Magdalena. 2012. "The Irish bee", in: Jaskuła, Krzysztof and Wojciech Malec (eds.), *Linguistic meetings across borders*. Zamość: Państwowa Wyższa Skoła Zawodowa, 45-58.

Clausner, Timothy C. and William Croft. 1999. "Domains and image schemas", *Cognitive Linguistics* 10, 1-31.

Cléirigh, Chris. 1998. A selectionist model of the genesis of phonic texture: Systemic phonology and universal Darwinism [Unpublished PhD dissertation, University of Sydney].

Clements, George N. and Elisabeth V. Hume. 1995. "The Internal organization of speech sounds", in: Goldsmith, John (ed.), *The handbook of phonological theory*. Cambridge, MA: Blackwell, 245-306

Colarusso, John. 1992. *A grammar of the Kabardian language*. Calgary: University of Calgary Press.

Coleman, John. 1992. "The phonetic interpretation of headed phonological structures containing overlapping constituents", *Phonology* 9.1: 1-44.

Colombel Véronique de. 1986. *Phonologie quantitative et synthématique avec application à l'ouldémé, langue tchadique du Nord-Cameroun*. Paris: Selaf.

Colombel, Véronique de. 2005. *La langue ouldémé. Nord-Cameroun: Grammaire, texte, dictionnaire*. Paris: Peeters.

Comrie, Bernard. 1981. *The languages of the Soviet Union*. Cambridge: Cambridge University Press.

Comrie, Bernard. 1991. "On Haruai vowels", in: Pawley, Andrew (ed.). 1991. *Man and a half: Essays in Pacific anthropology in honour of Ralph Bulmer*. Auckland: The Polynesian Society, 393-397.

Comrie, Bernard. 1993. "Typology and reconstruction", in: Jones, Charles (ed.). 1993. *Historical Linguistics*. London: Longman, 74-97.

Coseriu, Eugenio. [1988] 1992. *Competencia lingüística: Elementos de la teoría del hablar* [Sprachkompetenz. Grundzüge der Theorie des Sprechens]. (Translated by Francisco Meno Blanco and edited by Heinrich Weber) Madrid: Editorial Gredos. [Originally published, Tübingen: A. Franke Verlag].

Coupe, Alexander Robertson. 2007. *A grammar of Mongsen Ao*. Berlin: Mouton de Gruyter.

Coursil, Jacques. 1998. "Le syllabaire saussurien. Introduction à la phonologie des groupes", *Langages* 129: 76-88.

Cowgill, Warren. 1980. "The etymology of Irish *guidid* and the outcome of *g^{wh} in Celtic" in: Mayrhofer, Manfred and Martin Peters, Martin (eds.), *Lautgeschichte und Etymologie: Akten der VI. Fachtagung der indogermanischen Gesellschaft, Wien, 24-29 September 1978*. Wiesbaden: L. Reichert, 49-78.

Cowgill, Warren. 1983. “On the prehistory of Celtic passive and deponent inflection”, *Ériu* 34: 73-112.

Crothers, John. 1978. “Typology and universals of vowel systems”, in: Greenberg, Joseph H., Charles A. Ferguson, E. A. Moravcsik (eds.), *Universals of human language, Vol. 2: Phonology*. Stanford: Stanford University Press, 93-152.

Cyran, Eugeniusz. 1997. *Resonance elements in phonology: A study in Munster Irish*. Lublin: Wydawnictwo.

Cyran, Eugeniusz. 2003. *Complexity scales and licensing strength in phonology*. Lublin: Wydawnictwo Kul.

Davis, Philip W. and Ross Saunders. 1997. *A grammar of Bella Coola*. Missoula, MT: University of Montana.

de Bhaldraithe, Tomás. 1945. *The Irish of Cois Fhairrge, Co. Galway: A phonetic study*. Dublin: Dublin Institute for Advanced Studies.

de Bhaldraithe, Tomás. 1953. *Gaeilge Chois Fhairrge: An deilbhíocht*. Dublin: Dublin Institute for Advanced Studies.

de Búrca, Seán. 1958. *The Irish of Tourmakeady, Co. Mayo: A phonemic study*. Dublin: Dublin Institute for Advanced Studies.

de Búrca, Seán. 1960a. “Irish phoneme frequencies”, *Orbis* 9.1: 464-470.

de Búrca, Seán. 1960b. Review of *Gaeilge Theilinn: Foghraidheacht, gramadach, téacsanna* by Heinrich Wagner, *Language* 36.3: 450-454.

de Búrca, Seán. 1978. “Syllabicity and Palatalization”, *Studia Celtica* 13: 396-404.

de Búrca, Seán. 1980. “Epenthesis”, *Éigse* 18: 262-276.

Delamarre, Xavier. 2003. *Dictionnaire de la langue gauloise. Une approche linguistique du vieux-celtique continental*. Paris: Editions Errance.

Delattre, P. C., A. M. Liberman and F. S. Cooper. 1955. “Acoustic loci and transitional cues for consonants”, *Journal of the Acoustic Society of America* 27.4: 769-773.

Dell, François and Mohamed Elmedlaoui. 1985. “Syllabic consonants and syllabification in Imdlawn Tashlhiyt Berber”, *Journal of African Languages and Linguistics* 7.2: 105-130.

Dell, François and Mohamed Elmedlaoui. 2002. *Syllables in Tashlhiyt Berber and Moroccan Arabic*. Dordrecht: Springer Science and Business Media.

Diehl, Randy L. and Keith R. Kluender. 1989. “On the objects of speech perception”, *Ecological Psychology* 1: 121-144.

Dixon, R. M. W. 2002. *Australian languages: Their nature and development*. Cambridge: Cambridge University Press.

Dominicis, Amedeo de. 2001. The Masa tonal system. (Paper presented at the Typology of African Prosodic Systems Workshop, Bielefeld University, Germany , May 18-20, 2001).

Donegan, Patricia and David Stampe. 2009. "Hypotheses of Natural Phonology", *Poznań Studies in Contemporary Linguistics* 45.1: 1-31.

Donegan, Patricia. 1978. On the natural phonology of vowels [Unpublished PhD dissertation, University of Ohio].

Dorman, M. F., L. J. Raphael, and A. M. Liberman. 1979. "Some experiments on the sound of silence in phonetic perception", *Journal of the Acoustic Society of America* 65: 1518-1532.

Dottin, Georges. 1913. *Manuel d'irlandais moyen*. Paris: Librairie Ancienne Honor Champion.

Doyle, Aidan. 2001. *Irish*. Munich: Lincom Europa.

Dresher, B. Elan. 2009. *The contrastive hierarchy in phonology*. Cambridge: Cambridge University Press.

Dryer, Matthew S. & Haspelmath, Martin (eds.) 2013. *The world atlas of language structures online*. Leipzig: Max Planck Institute for Evolutionary Anthropology. (http://wals.info) (date of access 12 Jun. 2016)

Duanmu, Sam. 2007. *The phonology of standard chinese*. Oxford: Oxford University Press.

Egmond, Marie-Elaine van. 2012. Enindhilyakwa phonology, morphosyntax and genetic position. [Unpublished PhD dissertation, University of Sydney].

Engstrand, Olle and Krull, Diana. 1991. "Effect of inventory size on the distribution of vowels in the formant space: Preliminary data for seven languages", *PERILUS* 13: 15-18.

Eska, Joe. 2009. "Where have all the object pronouns gone? The growth of object agreement in earlier Celtic", ZCP 57: 25-47.

Eska, Joseph F. and Ellis D. Evans. 1993. "Continental Celtic", in Martin J. Ball and James E. Fife (eds.), *The Celtic languages*. London: Routledge, 28-54.

Eska, Joseph F. and Ellis D. Evans. 2009. "Continental Celtic", in Martin J. Ball and Nichole Müller (eds.), *The Celtic languages*. London: Routledge, 28-63.

Fant, Gunnar. 1960. *Acoustic theory of speech production with calculations based on X-ray studies of Russian articulations*. The Hague: Mouton.

Fattovich, Anna. 2010. *Introduzione allo studio di medio irlandese* [Introduction to the study of Middle Irish]. Trieste: Edizioni Università di Trieste.

Ferguson, C. A. 1978. "The emphatic /l/" in S. al-Ani, (ed.), *Contributions to Arabic linguistics*. Bloomington: Indiana University Press.

Feuth, Els. 1983. "Gemination: An Old Irish mutation rule?", *Ériu* 34: 143-156.

Finck, Franz Nikolaus. 1899. *Die araner Mundart*. Marburg: N. G. Elwert.

Firth, J. R. and Rogers B.B. 1937. "The Structure of the Chinese Monosyllable in a Hunanese Dialect. (Changsha)", in *Bulletin of the School of Oriental and African Studies* 8.4: 1055-1074.

Firth, John Rupert. 1948. "Sounds and Prosodies", *Transactions of the Philological Society* 47.1: 127-52.

Flemming, Edward. 2004. "Contrast and perceptual distinctiveness", in: Hayes, Bruce, Richard Kirchner, and Donca Steriade (eds.), *Phonetically-based phonology*. Cambridge: Cambridge University Press, 232-276.

Fletcher, Janet and Andrew R. Butcher. 2002. "Vowel dispersion in two northern Australian languages: Dalabon and Bininj Gun-Wok", in *Proceedings of the 9th Australian International Conference on Speech Science and Technology*: 343-348.

Fletcher, Janet, Hywel Stoakes, Deborah Loakes, and Andrew R. Butcher. 2007. "Spectral and durational properties of vowels in Kunwinjku", *Proceedings of the 16th International Congress of the Phonetic Sciences, 6-10 August 2007*: 937-940.

Fọlárìn, Antonia Yétúndé. 1988. "On predicting the glottal stop in Hualapai", *Kansas Working Papers in Linguistics* 13: 32-43.

Foley, William A. 1986. *The Papuan languages of New Guinea*. Cambridge: Cambridge University Press.

Foley, William A. 1991. *The Yimas language of New Guinea*. Stanford, California: Stanford University Press.

Foreman, Velma and Helen Marten. 1978. *Yessan-Mayo phonemes*. Summer Institute of Linguistics.

Foreman, Velma. 1974. *A grammar of Yessan-Mayo*. Ukarumpa: Summer Institute of Linguistics.

Forsyth, Katherine. 1996. The ogham inscriptions of Scotland: An Edited Corpus. [Unpublished PhD Dissertation, Harvard University.].

Fowler, Carol A. 2010. "The reality of phonological forms: A reply to Port", *Language Sciences* 32: 56-9.

Frajzyngier, Zygmunt. 2008. *A grammar of Gidar*. Frankfurt am Main: Peter Lang.

Fraser, Helen. 1996. "An introduction to phenomenological phonology (PP)", in: McCormack, Paul and Alison Russell (eds.), *Proceedings of the sixth Australian International Conference on Speech Science and Technology*. Canberra: Australian Speech Science and Technology Association, 163-8.

Friesen, Dianne and Mamalis, Megan. 2004. *The Moloko verb phrase*. SIL Cameroon: Yaoundé.

Galloway, Brent. 1989. Review of *The Bella Coola language* by Hank F. Nater, *International Journal of American Linguistics* 55.1: 97-105.

Gamkrelidze, T. and G. Mačavariani, G. 1965. *Sonantt'a sistema da ablauti k'art'velur enebši: Saert'o-k'art'veluri struk'turis tipologia* [The system of sonants and ablaut in Kartvelian languages : A typology of common Kartvelian structure]. Tbilisi.

Garvin, Paul L. 1950. "Wichita I: Phonemics", *International Journal of American Linguistics* 16.4: 179-184.

Gendrot, Cédric and Martine Adda-Decker. 2006. Is there a universal impact of duration on formant frequency values of oral vowels?: An automated analysis of speech from eight languages. (Poster presented at LabPhon 10, Paris, June 2006).

Gendrot, Cedric; Adda-Decker, Martine; Vaissière, Jacqueline. 2008. "Les voyelles /i/ et /y/ du français: Aspects quantiques et variations formantiques", *Actes des XXVIIèmes Journées d'Étude sur la Parole, 9-13 juin 2008 - Avignon, France*: 205-8.

Genko, Anatolij Nesterovič. 1955. *Abazinskij jazyk: Grammatičeskij očerk narečija tapanta*. [The Abaza language: Essay on the grammar of the dialect of Tapant]. Moskva: Akademia Nauk. SSSR.

Gensler, Orin. 1993. A typological evaluation of Celtic/Hamito-Semitic syntactic parallels [Unpublished PhD dissertation, University of California Berkeley].

Gleasure, James. 1973. “More on (s)beach/(s)meach”, *Ériu* 24: 186-91.

Gnanadesikan, Amalia Elisabeth. 1997. Phonology with ternary scales [PhD dissertation, University of Massachusetts at Amherst].

Goldsmith, John. 1976. Autosegmental Phonology [PhD dissertaion, Massachussets Institute of Technology].

Gordon, Matthew and Ayla Applebaum. 2006. “Phonetic structures of Turkish Kabardian”, *Journal of the International Phonetic Association* 36.2: 159-186.

Gordon, Matthew and Ayla Applebaum. 2010. “Prosodic fusion and minimality in Kabardian”, *Phonology* 27: 45-76.

Grady, Joe E. 2005. “Image schemas and perception: Refining a definition”, in: Hampe, Beate and Joe E. Grady (eds.), *From perception to meaning: Image schemas in Cognitive Linguistics*. Berlin: Mouton de Gruyter, 35-56.

Grammont, Maurice. 1933. *Traité de phonétique*. Paris: Libraire Delgrave.

Gravina, Richard; Timothée, Sabataï; Thomas, Golamadang. 2005. *L'orthographe de la langue guemzek: Esquisse préliminair*e. Yaoundé: SIL.

Gravina, Richard. 1997. *The vowel system of Mbuko*. Yaoundé: SIL.

Gravina, Richard. 1999. *The phonology of Mbuko*. Yaoundé: SIL.

Gravina, Richard. 2001. “Features of a Chadic language: the case of Mbuko phonology”, in: Mutaka, Ngessimo M. and Sammy B. Chumbow. *Research mate in African linguistics: Focus on Cameroon*. Köln: Rüdiger Köppe Verlag, 119-132.

Gravina, Richard. 2014. *The phonology of Proto-Central Chadic: The reconstruction of the phonology and lexicon of Proto-Central Chadic, and the linguistic history of the Central Chadic languages*. Utrecht: LOT.

Green, Anthony. 1995. *Old Irish verbs and vocabulary*. Somerville, MA: Cascadilla.

Green, Anthony. 1997. The prosodic structure of Irish, Scots Gaelic, and Manx [Unpublished PhD dissertation, Cornell University].

Green, Anthony. 2006. “The independence of phonology and morphology: The Celtic mutations”, *Lingua* 116: 1946-1985.

Greenberg, Joseph. 1966. “Some universals of grammar with particular reference to the order of meaningful elements”, in: Greenberg, Joseph (ed.), *Language*

universals: with special reference to feature hierarchies. The Hague, Mouton, 73-113.

Greene, David. 1956. "Gemination", *Celtica* 3: 284-289.

Greene, David. 1962. "The colouring of consonants in Old Irish", *Proceedings of the Fourth International Conference of the Phonetic Sciences held at the University of Helsinki, 4–9 September 1961*: 62-64. The Hague: Mouton.

Greene, David. 1966. "The spirant mutation in Brythonic", *Celtica* 7: 116-119.

Greene, David. 1973. "The growth of palatalization in Irish", *Transactions of the Philological Society* 72.1: 127-136.

Greene, David. 1976. "The diphthongs of Old Irish", *Ériu* 27: 26-45.

Griffith, Aaron, and David Stifter. 2007-13. *A dictionary of the Old-Irish glosses in the Milan Codex Ambrosianus C 301*. Institut für Sprachwissenschaft, Universität Wien. Online at http://www.univie.ac.at/indogermanistik/milan_glosses.

Griffith, Aaron. 2007. "The effect of syncope with subsequent anaptyxis on consonant quality in Old Irish", *Ériu* 57: 35-47.

Griffith, Aaron. 2008. "The animacy hierarchy and the distribution of the notae augentes in Old Irish", *Ériu* 58: 55-75.

Griffith, Aaron. 2009. "The Old Irish deponent suffixless preterite", *Keltische Forschungen* 4: 169-187.

Griffith, Aaron. 2011. "Old Irish pronouns: Agreement affixes vs. clitic arguments" in: Carnie, Andrew (ed.), *Formal approaches to Celtic linguistics*. Newcastle upon Tyne: Cambridge Scholars Publishing, 65-94.

Gussmann, Edmund. 1986. "Autosegments, linked matrices and Irish lenition", in: Kastovsky, D. and A. Szwedek (eds.), Linguistics across Historical and Geographic. Amsterdam: Mouton de Gruyter, 891-907.

Gussmann, Edmund. 2002. *Phonology: Analysis and theory*. Cambridge: Cambridge University Press.

Hale, Kenneth. 1959. Kaititj field notes. [Unpublished ms.]

Hale, Mark and Charles Reiss. 2008. *The phonological enterprise*. Oxford: Oxford University Press.

Hale, Mark. 2000. "Marshallese phonology, the phonetics-phonology interface and historical linguistics", *The Linguistic Review* 17: 241-257.

Hall, Daniel Curry. 2009. Phonemic and phonetic contrast in small vowel inventories. (Paper presented at Toronto-Tromsø Phonology Workshop, University of Toronto, October 2009).

Halle, Morris. 1970. "Is Kabardian a vowel-less language?", *Foundations of Language* 10.6: 95-103.

Halliday, M. A. K. 1992. "A systemic interpretation of Peking syllable finals", in: Tench, Paul (ed.), *Studies in Systemic Phonolog*y. London: Pinter, 98-121.

Halliday, M. A. K.. 2005. *Studies in Chinese language*. London: Continuum.

Hamilton, John Noel. 1974. *A phonetic study of the Irish of Tory Island, County Donegal*. Belfast: Queen's University Belfast.

Hamp, Eric P. 1951. "Morphophonemes of the Keltic mutations", *Language* 27.3: 230-247 .

Hamp, Eric P. 1971. "The 'bee' in Irish, Indo-European and Uralic", *Ériu* 22: 184-187.

Hamp, Eric P. 1986. "Varia: 25. Notes on word formation: 3. Irish *gu(s)* 'to choose'", *Études Celtiques* 23: 48-49.

Hampe, Beate and Joe Grady (eds.). 2005. *From perception to meaning: Image schemas in Cognitive Linguistics*. Berlin: Mouton de Gruyter.

Hankamer, Jorge. 2011. "Turkish vowel epenthesis", in: Taylan, Eser Erguvanlı and Bengisu Rona (eds.), *Puzzles of language: Essays in honour of Karl Zimmer*. Wiesbaden: Harrassowitz, 55-70.

Hardy, Heather K. 1979. "The development of the Pai vowel system", in Redden, James E. (ed.), *Proceedings of the 1978 Hokan Languages Workshop, held at University of California, San Diego, June 27-29, 1978*. Carbondale: North Illinois University, 29-41.

Harrell, R. S. 1960. "A linguistic analysis of Egyptian radio Arabic", in C. A. Ferguson, (ed.). *Contributions to Arabic linguistics*. Cambridge, MA: Harvard University Press, 1-77.

Harris, John and Lindsey, Geoff. 1995. "The elements of phonological representation" in Durand, Jacques and Francis Katamba (eds.), *Frontiers of phonology: atoms, structures, derivations*. Harlow, Essex: Longman, 24-79.

Harris, John. 1996. "Phonological output is redundancy-free and fully interpretable", in: Durand, Jacques and Bernard Laks (eds.), *Current trends in phonology. Models*

and methods. Salford, Manchester: European Studies Research Institute, University of Salford, 305-332.

Harris, John. 2006. "The phonology of being understood: further arguments against sonority", *Lingua* 116: 1483-1494.

Harris, Zellig S. 1944. "Simultaneous Components in Phonology", *Language* 20.4: 181-205.

Harris, Zellig S. 1951. *Structural linguistics*. Chicago: Phoenix.

Hartman, Lawton D. 1944. "The segmental phonemes of the Peiping Dialect", *Language* 20.1: 28-42.

Harvey, Anthony. 1987. "The Ogham inscriptions and their geminate consonant symbols", Ériu 38: 45-71.

Harvey, Anthony. 1990. "Retrieving the pronunciation of early insular Celtic scribes: towards a methodology", *Celtica* 21: 178-90.

Hashimoto, Mantaro. 1970. "Notes on Mandarin phonology", in: Jakobson, Roman and Shigeo Kawamoto. *Studies in general and oriental Linguistics*. Tokyo: TEC, 207-20.

Haspelmath, Martin and Olga Buchholz. 1998. "Equative and similative constructions in the languages of Europe", in: van der Auwera, Johan (ed.), *Adverbial constructions in the languages of Europe*. Berlin: Mouton de Gruyter, 277-334.

Haspelmath, Martin. 1998. "How young is Standard Average European?", *Language Sciences* 20.3: 271-287.

Haspelmath, Martin. 2001. "The European linguistic area: Standard Average European", in: Haspelmath, Martin et al. (eds.), *Language typology and language universals: An international handbook. Volume 2.* New York: Walter de Gruyter, 1492-1510.

Haspelmath, Martin. 2010. "Comparative concepts and descriptive categories in crosslinguistic studies", *Language* 86.3: 663-687.

Heath, Jeffrey. 1975. *Draft grammatical sketch of Anindhilyagwa. Groote Eylandt, Australia.* Canberra: AIATSIS.

Hellwig, Brigit. 2011. *A Grammar of Goemai*. Berlin: Mouton de Gruyter.

Henebry, Richard. 1898. *The sounds of Munster Irish: Being a contribution to the phonology of Desi-Irish to serve as an introduction to the metrical system of Munster poetry*. Dublin: Gill.

Hewitt, George. 1979. *Abkhaz*. Amsterdam: North Holland Publishing Company.

Hewitt, George. 2005. "North West Caucasian", *Lingua* 115: 91-145.

Hewitt, Steve. 2009. "The question of a Hamito-Semitic substratum in Insular Celtic", *Language and Linguistics Compass* 3: 972-995.

Hickey, Raymond. 1986. "Issues in the vowel phoneme inventory of western Irish", *Éigse* 21: 214-26 .

Hickey, Raymond. 2012. *The dialects of Irish*. Berlin: de Gruyter.

Hinton, Leanne. 1976. Analysis of Havasupai songs. [Unpublished PhD dissertation, University of California, San Diego].

Hinton, Leanne. 1980. "When sounds go wild: Phonological change and syntactic reanalysis in Havasupai", *Language* 56.2: 320-44.

Hinton, Leanne. 2001. "Sleeping languages: Can they be awakened?", in: Hinton, Leanne, and Kenneth Hale (eds.), *The green book of language revitalization in practice*. San Diego: Academic Press, 413–17.

Hjelmslev, Louis. 1936-1937. "Accent, intonation, quantité", *Studi Baltici* 6: 1-57.

Hock, Hans Heinrich. 1986. *Principles of historical linguistics*. Berlin: Mouton de Gruyter.

Hock, Hans Heinrich. 2009. Old Irish consonant quality. Reexamined. (Paper presented at 42nd Annual Meeting of the Societas Linguistica Europaea, Lisbon 9-12 September, 2009).

Hock, Hans Heinrich. 2015. Old Irish consonant quality reexamined. (Paper presented at 22nd International Conference on Historical Linguistics, Naples 27-31 July, 2015).

Hockett, Charles F. 1947. "Peiping phonology", *Journal of the American Oriental Society* 67: 253-67.

Hockett, Charles Francis. 1955. *A manual of phonology*. Baltimore: Waverly Press.

Hoenigswald, H. M. 1960. *Language change and linguistic reconstruction*. Chicago: University of Chicago Press .

Hoffmann, Carl. 1955. Untersuchungen zur Struktur und sprachlichen Stellung des Bura. [Unpublished PhD dissertation, University of Hamburg].

Hoffmann, Carl. 1963. *A grammar of the Margi Language*. Oxford: Oxford University Press.

Hoffmann, Carl. 1965. A tentative analysis of the phonology of Higi. (Paper presented at the University of Legon, Accra, Ghana).

Hoffmann, Erica. 1990. A preliminary phonology of Bana. [Unpublished MA Dissertation, University of Victoria].

Holes, Clive. 2004. *Modern Arabic structures, functions, and varieties*. Washington DC: Georgetown University Press.

Holmer, Nils M. 1940. *On some relics of the Irish dialect spoken in the Glens of Antrim*. Uppsala: Almvist ך Wiksells.

Holmer, Nils M. 1962. *The dialects of Co. Clare, Part 1*. Dublin: Todd Lecture Series, vol. 19.

Hoskison, James T. 1974. "Prosodies and verb stems in Gude", *Linguistics* 12: 17-26.

Hoskison, James T. 1975. The Phonology of Gude. [Unpublished MA dissertation, Ohio State University].

Hoskison, James T. 1983. A grammar and dictionary of the Gude Language. [Unpublished PhD dissertation, Ohio State University].

Howe, Darin M. 2001. Syllabic obstruents in Oowekyala. (Paper presented at Workshop on American Indian Languages, UC Santa Barbara, 7 June, 2001).

Husserl, Edmund. [1931] 1960. *Cartesian meditations*. (Translated by Dorion Cairns) The Hague: Martinus Nijhoff.

Idsardi, William James. 1990. Syllabification and reduplication in Bella Coola. [Unpublished ms.] (http://ling.umd.edu/~idsardi/papers/) (date of access: 27 Dec. 2013)

Ikeda, Elissa and Sigrid Lew. 2015. Fricative rhotics in Nusu. (Paper presented at the 18th International Congress of Phonetic Sciences, Glasgow, 10-14 August 2015.)

Iosad, Pavel and Ní Chiosáin, Máire. 2016. Vowel backness and palatalization in Irish and Scottish Gaelic: A study in rule scattering. (Paper presented at Old World Conference in Phonology 13, Budapest, Hungary, 13-15 January, 2016).

Iosad, Pavel. 2010. Right at the left edge: Initial consonant mutations in the world's languages. In Michael Cysouw and Jan Wohlgemuth (eds.), *Rethinking universals: How rarities affect linguistic theory*. Berlin: Mouton de Gruyter, 105-138.

Isaac, Graham. 2005. "Insular Celtic vs. Gallo-Brittonic: an empirical or a methodological question?", in: Gilles, W. and D. W. Harding, *Celtic*

connections: Papers from the tenth International Congress Of Celtic Studies. Edinburgh, 190-202.

Isaac, Graham. 2007. "Celtic and Afro-Asiatic", in: Tristam, Hildegard L.C. (ed.), *The Celtic Languages in Contact: Papers from the workshop within the framework of the XIII International Congress of Celtic Studies*. Potsdam: Potsdam University Press, 25-80.

Jackson, Kenneth H. 1953. *Language and history in Early Britain*. Edinburgh: Edinburgh University Press.

Jaeger, J. J. 1980. Categorization in phonology: an experimental approach [Unpublished PhD dissertation, University of Berkeley].

Jakobson, Roman and Morris Halle. 1956. *Fundamentals of language*. The Hague: Mouton.

Jakobson, Roman, Gunnar Fant and Morris Halle. 1951. *Preliminaries to speech analysis: The distinctive patures and their correlates*. Cambridge, MA: M.I.T. Press.

Jakobson, Roman. 1929. "Remarques sur l'évolution phonologique du russe comparée à celle des autres langues slaves" (Translated by Ruwet, Nicolas). [Reprinted in Roman Jakobson, 1963, *Essais de linguistique générale. 1. Les fondations du langage*. Paris: Les Éditions de Minuit, 7-116].

Jakobson, Roman. 1958. "Typological Studies and their Contribution to Historical Comparative Linguistics", *Proceedings of the Eighth International Congress of Linguists, Oslo, August, 1957*. [Reprinted in Roman Jakobson, 1963, *Essais de linguistique générale. 1. Les fondations du langage*. Paris: Les Éditions de Minuit, 17-25.]

Jakovlev, Nikolai F. 1923. Таблицы фонетики кабардинского языка [Tables for the phonetics of the Kabardian language]. Moscow. [Reprinted in: 1983. *Problems of Linguistics* 6: 128-134]

Jakovlev, Nikolai F. 1928. "Математическая формула постронрия алфавита: опыт практического приложения лингвистической теории" [Mathematical formula for the construction of an alphabet: practical experience in the application of linguistic theory], in: *Культура и письменность Востока*, кн. I. [Culture and Lliterature of the East, Vol. I.] Moscow. 41-64. [Reprinted in: Reformatsky, A. A. (ed.). 1970. *Из истории отечественной фонологии*. [From the history of Russian phonology]. Moscow: Nauka.

Janda, Richard D. 2003. "'Phonologization' as the start of dephoneticization — or, on sound change and its aftermath: Of extension, generalization, lexicalization, and morphologization", in: Joseph, Brian R. and Richard D. Janda (eds.), *The handbook of historical linguistics*. Oxford: Blackwell, 402-422.

Jasanoff, Jay. 1997. "An Italo-Celtic isogloss: the 3pl. mediopassive in *ntro", in: Adams, Douglas (ed.), *Festschrift for Eric P. Hamp*. Washington DC: Institute for the Study of Man, 146-161.

Jaskuła, Krzysztof. 2006. *Ancient sound changes and Old Irish phonology*. Lublin: Wydawnictwo KUL.

Jaskuła, Krzysztof. 2014. "A pragmatic approach to Old Irish consonant qualities", *Journal of Celtic Linguistics* 15.1: 39-51.

Jaworski, Adam. 2005. "Introduction: Silence in institutional and intercultural contexts", *Multilingua* 24: 1-6.

Jendraschek, Gerd. 2007. *Iatmul-English dictionary*. Victoria: Research Centre for Linguistic Typology.

Jendraschek, Gerd. 2008. The vowel system of Iatmul: Emerging phonemes and unexpected contrasts. (Paper given at Second Sydney Papuanists Workshop, University of Sydney, 29 June, 2008).

Jendraschek, Gerd. 2012. A grammar of Iatmul [Unpublished doctoral dissertation, University of Regensburg].

Job, Dieter Michael. 1977. *Probleme eines typologischen Vergleichs iberokaukasischer und indogermanischer Phonemsysteme im Kaukasus*. Frankfurt am Main: Peter Lang.

Joel, Dina Judith. 1966. *Paipai phonology and morphology*. [Unpublished PhD dissertation, University of California, Los Angeles].

Johannesen, Richard L. 1974. "The functions of silence: a plea for communication research", *Western Speech* 38: 25-35.

Johanson, Lars. 1998. "The structure of Turkic", in: Johanson, Lars and Éva Á. Csató (eds.), *The Turkic Languages*. London: Routledge, 30-66.

Johnson, Mark. 1987. *The body in the mind. The bodily basis of meaning, imagination and reason*. Chicago: Chicago University Press.

Jones, Daniel. 1950. *The phoneme, its nature and use*. Cambridge: Heffer.

Jongman, Allard, Wendy Herd, and Mohammad Al-Masri. 2007. “Acoustic correlates of emphasis in Arabic”, *Proceedings of the International Congress of Phonetic Sciences* XVI: 913-916.

Joos, Martin. 1963. *Readings in Linguistics: The development of descriptive linguistics in America since 1925*. New York: American Council of Learned Societies.

Jordán Cólera, Carlos. 2007. “Celtiberian”, *e-Keltoi* 6: 749-850.

Joseph, Lionel. 1987. “The origins of the Celtic denominative formation in *-sag-”, in: Watkins, Calvert (ed.), *Studies in memory of Warren Cowgill (1929-1985): Papers from the Fourth East Coast Indo-European Conference, Cornell University, June 6-9, 1985*. Berlin: de Gruyter, 113-159.

Jungraithmayr, Hermann and W. J. G. Möhlig. 1986. *Einführung in die Hausa-Sprache*. Berlin: Dietrich Reimer Verlag.

Jungraithmayr, Hermann, Njẹ̣ṇọ Andirya Galadima, and Ulrich Kleinewillinghöfer. 1991. *A dictionary of the Tangale language: Kaltungo, Northern Nigeria.* Berlin: Dietrich Reimer Verlag.

Jungraithmayr, Hermann. 1970. *Die Ron-Sprachen*. Glückstadt: Verlag J. J. Augustin.

Kavanagh, Séamus. 2001. *A lexicon of the Old Irish glosses in the Würzburg manuscript of the epistles of St. Paul*. Vienna.

Kaye, Jonathan. 1989. *Phonology: A cognitive view*. Hillsdale, NJ: L. Erlbaum.

Kaye, Jonathon, Lowenstamm, Jean and Vergnaud, J-R. 1985. “The internal structure of phonological elements: A theory of charm and government”, *Phonology Yearbook* 2: 305-328.

Keating, Patricia. 1984. “Universal phonetics and the organization of grammars”, *UCLA Working Papers in Phonetics* 59: 35-49.

Kelly, Deirdre Mary. 1978. *Morphologization in Irish and Southern Paiute*. [Unpublished PhD dissertation, University of Texas at Austin].

Kelly, John. 1969. Notes on Eileen Whitley’s lecture on modern Irish phonology [Unpublished ms, Firthian Phonology Archive, York].

Kelly, John. 2005. “Saying different things: E. M. Whitley's Early Phonological Analysis of Irish”, *York Papers in Linguistics* 2.4: 91-124.

Kenstowicz, Michael J. 1994. *Phonology in generative grammar*. Cambridge, MA: Blackwell.

Kern, Gretchen. 2010. On secondary stress in Old Irish. (Paper presented at 32nd Annual University of California Celtic Studies Conference, UCLA).

Kern, Gretchen. 2013. Old Irish pronouns, agreement and disagreement. (Paper presented at 33rd Harvard Celtic Colloquium, 11 October, 2013).

Khalafallah, Abdelghany A. 1969. *A descriptive grammar of Sa̲ʕi:di Egyptian colloquial Arabic*. The Hague: Mouton.

Kidda, Mairo E.. 1993. *Tangale phonology: A descriptive analysis*. Berlin: Dietrich Reimer Verlag.

Kiparsky, Paul. 2015. "Phonologization" in: Honeybone, Patrick and Joseph C. Salmons (eds.), *The Oxford handbook of historical phonology*. Oxford: Oxford University Press, 563-582.

Knott, Eleanor. 1957. *An introduction to Irish syllabic poetry of the period 1200-1600; with selections, notes, and glossary*. Dublin: Dublin Institute for Advanced Studies.

Koch, Harold. 1984. "The category of "associated motion", in Kaytej", *Language in Central Australia* 1: 23-34.

Koch, Harold. 1997. "Pama-Nyungan reflexes in the Arandic languages", in: Tryon, D. T. and Michael Walsh (eds.). *Boundary rider: Essays in honour of Geoffrey O'Grady*. Canberra: Pacific Linguistics, 271-302.

Koch, John T. 1992a. "'Gallo-Brittonic' vs. 'Insular Celtic': The Inter-relationships of the Celtic Languages Reconsidered", in: G. Le Menn (ed), *Bretagne et pays celtiques – langue, histoire, civilisation. Mélanges offerts à la memoire de Léon Fleuriot*. Rennes: Presses Universitaires Rennes, 471-495.

Koch, John T. 1992b. "Further to *tongu do día toinges mo thúath*, etc.", *Études Celtiques* 29: 249-261.

Koch, John T. 2010. "Paradigm Shift? Interpreting Tartessian as Celtic", in John T. Koch and Barry Cunliffe (eds.), *Celtic from the West*. Oxford: Oxbrow.

Kochetov, Alexei. 2006. "Testing licensing by cue: A case of Russian palatalized coronals", *Phonetica* 63:113-148.

Koops, Robert. 2009. *A grammar of Kuteb: a Junkoid language of East-Central Nigeria*. Köln: Rüdiger Köppe Verlag.

Kortlandt, Frederik. 1979. "The Old Irish absolute and conjunct endings and questions of relative chronology", *Ériu* 30: 35-53.

Kortlandt, Frederik. 1995. “General linguistics and Indo-European reconstruction”, *Rask* 2: 91-109.

Kortlandt, Frederik. 2007. *Italo-Celtic origins and prehistoric development of the Irish language*. Amsterdam: Rodopi.

Kortmann, Bernd. 1998. “Adverbial subordinators in the languages of Europe”, in: van der Auwera, Johan (ed.), *Adverbial constructions in the languages of Europe*. Berlin: Mouton de Gruyter, 457-561.

Kozlowski, Edwin. 1976. “Remarks on Havasupai phonology”, *International Journal of American Linguistics* 42: 140-149.

Kroeber, Alfred Louis. 1943. *Classification of the Yuman languages*. Berkeley: University of California Press.

Kruszewski, Mikołaj. [1881] 1995. “On sound alternation” (translated by Robert Austerlitz), in: Kruszewski, Mikołaj, *Writings in general linguistics* (edited by E. F. K. Koerner). Amsterdam: John Benjamins.

Kuipers, Aert H. 1960. *Phoneme and morpheme in Kabardian. Eastern Adyghe.* The Hague: Mouton.

Kuipers, Aert H. 1968. “Unique types and typological universals”, in: Heesterman, J. C., Godhard H. Schokker, and V. I. Subramoniam (eds.). 1968. *Pratidanam Indian, Iranian, and Indo-European studies presented to Franciscus Bernardus Jacobus Kuiper on his sixtieth birthday*. The Hague: Mouton, 68-88.

Kuipers, Aert H. 1976. “Typologically salient features of some Northwest Caucasian languages”, *Studia Caucasica* 3: 101-127

Kumaxov, Muchadin Abubekirovič. 1973. “Teorija monovokalizma i zapadnokavkazskie jazyki” [The mono-vocalic theory and the West-Caucasian languages], *Voprosy Jazykoznanija*. [Reprinted in: *Questions of Linguistics* 6: 54-67.

Kurowski, Kathleen and Sheila E. Blumstein. 1987. “Acoustic properties for place of articulation in nasal consonants”, *Journal of the Acoustic Society of America* 86: 1917-1927.

Kurpaska, Maria. 2010. *Chinese Language(s): a look through the prism of* ‘The great dictionary of modern Chinese dialects’. Berlin: Mouton de Gruyter.

Kuryłowicz, Jerzy. 1935. *Études indoeuropéennes*. Kracow: Polska Akademja Umiejętności.

Ladd, D. Robert. 2009. Systematic phonetics and phonological theory. (Paper presented at the 17th Manchester Phonology Meeting, University of Manchester, May 2009).

Ladd, D. Robert. 2011. "Phonetics in phonology", in: Goldsmith, John, Jason Riggle and Alan C. Yu (eds.), *Handbook of phonological theory*. London: Blackwell, 348-373.

Ladefoged, Peter, and Ian Maddieson. 1996. *The sounds of the world's languages*. Oxford: Blackwell.

Ladefoged, Peter, Jenny Ladefoged, Alice Turk, Kevin Hind, and St. John Skilton. 1998. "Phonetic Structures of Scottish Gaelic", *Journal of the International Phonetic Association* 28: 1-41.

Lakoff, George. 1987. *Women, fire and dangerous Things: What categories reveal about the mind*. Chicago: University of Chicago Press.

Lakoff, George. 1990. "The invariance hypothesis: is abstract reason based on image-schemas", *Cognitive Linguistics* 1.1: 39-74.

Lambert, Pierre-Yves. 1994. *La langue gauloise: Description linguistique, commentaire d'inscriptions choisies*. Paris: Errance.

Langacker, Ronald W. 1987. *Foundations of Cognitive Grammar*, *Volume I, theoretical prerequisites*. Stanford: Stanford University Press.

Langacker, Ronald W. 2006. "Subjectification, grammaticization and conceptual archetypes", in: Athanasiadou A., C. Canakis, and B. Carnille (eds.), *Subjectification: Various paths to subjectivity*. Berlin: Mouton de Gruyter, 17-40.

Langdon, Margaret. 1976. "The Proto-Yuman vowel system", in: Langdon, Margaret and Shirley Silver (eds.), *Hokan Studies*. The Hague: Mouton, 129-148.

Langdon, Margaret. 1996. "Some Mysteries in the Reconstruction of Proto-Yuman", in *Proceedings of the Twenty-Second Annual Meeting of the Berkeley Linguistics Society: Special Session on Historical Issues in Native American Languages*: 90-103.

Langermann, Cindy. 1994. *A phonological description of Hedi*. Yaoundé, Cameroon: SIL.

Lass, Roger. 1984. "Vowel system universals and typology: Prologue to theory", *Phonology Yearbook* 1: 75-111.

Laycock, Don. 1991. “Three vowels, semivowels and neutralisation: orthographic and other problems of Sepik languages”, in: Dutton, Tom (ed.), *Papers in Papuan Linguistic*s 1. Canberra: Pacific Linguistics, 107-113.

Le Mair, Esther. 2008. Some verbs in the Würzburg glosses. (Paper given at Tionól, Dublin Institute of Advanced Studies, 28 November 2008).

Le Mair, Esther. 2011. Secondary verbs in Old Irish [Unpublished PhD dissertation, National University of Ireland, Galway].

Lee, K. D. 1975. *Kusaiean reference grammar*. Honolulu: University Press Of Hawaii.

Leeding, Velma Joan. 1989. Anindilyakwa phonology and morphology. [Unpublished PhD dissertation, University of Sydney].

Lehiste, Ilse. 1970. *Suprasegmentals*. Cambridge, MA: MIT Press.

Lehmann, R. and W. P. Lehmann. 1975. *An introduction to Old Irish*. New York: Modern Language Association of America.

Lehmann, Winfred P. 1952. *Proto-Indo-European phonology*. Austin: University of Texas Press.

Lewis, Henry, and Holger Pedersen. 1937. *A concise comparative Celtic grammar*. Göttingen: Vandenhoeck & Ruprecht.

Lhuyd, Edward. 1707. *Archaeologia Britannica: An account of the languages, histories and customs of Great Britain, from travels through Wales, Cornwall, Bas-Bretagne, Ireland and Scotland*. Oxford.

Li, Fang-Kuei. 1966. “The zero initial and the zero syllabic”, *Language* 42.2: 300-302.

Liberman, Alvin M., Katherine S. Harris, Howard S. Hoffman, and Belver C. Griffith. 1957. “The discrimination of speech sounds within and across phoneme boundaries”, *Journal of Experimental Psychology* 54: 358-368.

Liljencrants, Johan and Lindblom, Björn. 1972. “Numerical simulation of vowel quality systems: The role of perceptual contrast”, *Language* 48.4: 839-62.

Lin, Hua. 2001. *A Grammar of Mandarin Chinese*. München: Lincom Europa.

Lindau-Webb, Mona. 1985. “Hausa vowels and diphthongs”, *Studies in African Linguistics* 16.2: 161ff.

Lindau, Mona. 1985. “The story of r.”, in: Victoria A. Fromkin (ed.), *Phonetic linguistics*. Orlando: Academic Press, 157-168.

Lindblom, Björn and Engstrand, Olle. 1989. “In what sense is speech quantal?”, *Journal of Phonetics* 17: 107-121.

Lindblom, Björn. 1967. “Vowel duration and a model of lip mandible coordination”, in *Speech Transmission Laboratory Quarterly Progress Report* 8.4: 1-29.

Lisker, Leigh. 1974. “On ‘explaining’ vowel duration variation”, *Haskins Laboratory Status Report on Speech Research* 37.8: 225-232.

Lithgow, Daphne. 1977. “Dobu phonemics”, *SIL Workpapers in PNG Languages* 19: 73-96.

Livijn, Peder. 2000. “Acoustic distribution of vowels in differently sized inventories - hot spots or adaptive dispersion?”, *Proceedings of the XIIIth Swedish Phonetics Conference, Skövde, Sweden, May 24-26, 2000*: 93-96.

Lovestrand, Joseph. 2011. The dialects of Baraïn. East Chadic B. (http://www.sil.org/resources/publications/entry/42842) (date of access: 31 Dec. 2013.)

Lovestrand, Joseph. 2012. Classification and description of the Chadic languages of the Guéra. East Chadic B. (http://www.sil.org/resources/publications/entry/49119) (date of access: 31 Dec. 2013).

Mac Cártaigh, Eoin. 2014. *The art of bardic poetry: A new edition of Irish grammatical tracts*. Dublin: Dublin Institute of Advanced Studies.

Mac Murchaidh, Ciarán. 2006. *Cruinnscríobh na Gaeilge* [Accurate writing of Irish]. Baile Átha Cliath: Cois Life.

Mac Neill, Eoin. 1931. “Beginnings of Latin culture in Ireland”, *Studies* 20: 39-48.

Macaulay, Donald (ed.). 1992. *The Celtic Languages*. Cambridge: Cambridge University Press.

Macaulay, Donald. 1962. “Notes on some noun-initial mutations in a dialect of Scottish Gaelic”, *Scottish Gaelic Studies* 9: 146-75.

Macauley, Donald. 1966. “Palatalization of labials in Scottish Gaelic and some related problems in phonology”, *Scottish Gaelic Studies* 11: 72-84.

Maddieson, Ian (ed.). 1984. *Patterns of sounds*. Cambridge: Cambridge University Press.

Malmberg, Bertil. 1967. *Structural linguistics and human communication; an introduction into the mechanism of language and the methodology of linguistics*. Berlin, New York: Springer-Verlag.

Manaster Ramer, Alexis and Bicknell, Belinda J. 1995. “Logic and philology: Incommensurability of descriptions of one-vowel systems”, *Journal of Linguistics* 31.1: 149-56.

Martin, Samuel E. 1957. “Problems of hierarchy and indeterminacy in Mandarin phonology”, *Bulletin of the Institute of History and Philology, Academia Sinica* 29: 209-229.

Martinet, André. 1952. “Celtic lenition and Western Romance consonants”, *Language* 28.2: 192-217 .

Martinet, André. 1955. *Économie des changements phonétiques*. Berne: A. Francke, 199-211.

Marx, Karl and Engels, Frederick. [1856] 1970. *Die deutsche Ideologie* [The German Ideology]. (Edited and translated by C. J. Arthur) New York: International Publishers.

Matasović, Ranko. 2007. “Insular Celtic as a language area”, in: Tristam, Hildegard L.C. (ed.), *The Celtic languages in contact: Papers from the workshop within the framework of the XIII International Congress of Celtic Studies*. Potsdam: Potsdam University Press, 93-112.

Matasović, Ranko. 2008. “The origin of the Old Irish f-future” in: Kortlandt, Frederik. H. H. and Alexander Lubotsky (eds.), *Evidence and counter-evidence: essays in honour of Frederik Korlandt*. Amsterdam: Rodopi, 361-6.

Matasović, Ranko. 2012a. “The substratum in Insular Celtic”, *Journal of Language Relationship* 8: 153-159.

Matasović, Ranko. 2012b. “The substratum in Insular Celtic (a response to Tatyana Mikhailova)”, *Journal of Language Relationship* 8: 165-168.

McCarthy, John. 1982. Review of *Syllables and Segments* by Alan Bell and Joan B. Hopper (eds.), *Language* 58.1: 198-204.

McCarthy, John. 1983. “Consonantal morphology in the Chaha verb”, in: Flickinger, Daniel P., Barlow Barlow and Michael T. Wescoat (eds.), *Proceedings of the West Coast Conference on Formal Linguistics*. Stanford, California: Stanford Linguistics Association, 122-134.

McCone, Kim. 1981. “Final /t/ to /d/ after unstressed vowels, and and Old Irish sound law”, *Ériu* 32: 10-27.

McCone, Kim. 1987. *The Early Irish verb*. Maynooth: An Sagart.

McCone, Kim. 1991. *The Indo-European origins of the Old Irish nasal presents, subjunctives and futures*. Innsbruck: Institut für Sprachwissenschaft der Universität Innsbruck.

McCone, Kim. 1996. *Towards a relative chronology of ancient and medieval Celtic sound change*. Maynooth: Department of Old and Middle Irish, St. Patrick's College.

McCone, Kim. 2005. *A first Old Irish grammar and reader, including an introduction to Middle Irish*. Maynooth: Department of Old and Middle Irish

McCone, Kim. 2006. *The origins and development of the Insular Celtic verbal complex*. Maynooth: Department of Old Irish.

McCone, Kim. 2015. "Unstressed vowels and consonant quality in Old Irish: *u* or non-*u*?", in: Breatnach, Liam, Ruairí Ó hUiginn, Damian McManus, and Katharine Simms, *Proceedings of the XIV International Congress of Celtic Studies, Maynooth 2011*. Dublin: Dublin Institute of Advanced Studies, 109-135.

McConville, Mark. 2013. "Reverse-engineering the morphophonology of Gaelic vowels from orthography: Language planning to linguistic theory, and back again' in Cruickshank and McColl Millar (eds.), *After the storm: Papers from the forum for research on the languages of Scotland and Ulster triennial meeting, Aberdeen 2012*. Aberdeen: Forum for Research on the Languages of Scotland and Ireland, 61-81.

McManus, Damian. 1988. "Irish letter-names and their kennings", *Ériu* 39: 127-168.

McManus, Damian. 1991. *A guide to Ogam*. Maynooth: An Sagart.

Merleau-Ponty, Maurice. 1945. *Phénoménologie de la perception*. Paris: Gallimard.

Merleau-Ponty, Maurice. 1960. *Signes*. Paris: Les Éditions Gallimard.

Meunier, Christine, Cheryl Frenck-Mestre, Taïssia Lelekov-Boissard, and Martine Le Besnerais. 2003. "Production and perception of vowels: Does the density of the system play a role?", *Proceedings of the 15th International Congress of Phonetic Sciences, Barcelona, Spain, 3-9 August 2003*: 723-726.

Mhac an Fhailigh, Éamonn. 1968. *The Irish of Erris, Co. Mayo: A phonemic study*. Dublin: Dublin Institute for Advanced Studies.

Mikailova, Tatyana. 2012. "Once again on the pre-Celtic substratum in the British Islands (a response to Ratko Matasović)", *Journal of Language Relationship* 8: 160-164.

Miller, Irving W. 1982. “Southern Paiute and Numic final features”, *International Journal of American Linguistics* 48.4: 444-449.

Mirt, H. 1969. “Einige Bemerkungen zum Vokalsystem des Mandara”, *Zeitschrift der Deutschen Morgenländischen Gesellschaft,* Supplement 1.3: 1096-1103.

Mohrlang, Roger. 1971. “Vectors, prosodies, and Higi vowels”, *Journal of African Languages* 10: 75-86.

Mohrlang, Roger. 1972. “Higi phonology”, *Studies in Nigerian Languages* 2: 1-106.

Molloy, Francis. 1677. *Grammatica Latino-Hibernica*. Romæ: ex typographia S. Cong. de Propag.

Morris Jones, John. 1913. *Welsh grammar: Historical and comparative*. Oxford: Clarendon Press.

Morris-Jones, John. 1899. “Pre-Aryan syntax in Insular Celtic”, in: Rhys, John and D. Brynmor-Jones (eds.), *The Welsh People*. Oxford: Oxford University Press, 617-641.

Mouchet, J. 1966. *Le parler daba: Esquisse grammaticale: Précédée d'une note sur l'ethnie Daba: Suivie de lexiques daba-français et français-daba*. Yaoundé: Institut de recherches scientifiques du Cameroun.

Nater, Hendricus Franciscus. 1983. A grammar of the Bella Coola language. [Unpublished PhD dissertation, University of Leiden].

Nater, Hendricus Franciscus. 1984. *The Bella Coola Language*. Ottowa: National Museums of Canada.

Nater, Hendricus Franciscus. 1990. *A concise Nuxalk-English dictionary*. Québec: Canadian Ethnology Service.

Nathan, Geoffrey S. 1996. “Towards a Cognitive Phonology”, in: Hurch and Rhodes (eds.) *Natural Phonology: The state of the art*. Berlin: Mouton de Gruyter, 107-120.

Nathan, Geoffrey S. 2007. “Phonology”, in: Geeraerts, Dirk and Hubert Cuyckens (eds.), *The Oxford handbook of Cognitive Linguistics*. Oxford: Oxford University Press, 611-631.

Ndokobaï, Dadak. 2003. Etude phonologique du cuvok et principe orthographiques. [Unpublished MA dissertation, Université de Yaoundé].

Nettle, Daniel. 1998. *The Fyem language of northern Nigeria*. München: Lincom Europa.

Neweklowsky, G. 1975. “Spezifische Dauer und spezifische Tonhöhe der Vokale”, *Phonetica* 32: 38-60.

Newman, Paul. 1977. *Chadic classification and reconstruction*. Malibu, Calif: Undena Publications.

Newman, Paul. 1997. “Hausa Phonology”, in Kaye, Alan S. (ed.), *Phonologies of Asia and Africa (including the Caucasus) Vol. 1*. Winona Lake: Eisenbrauns, 537-52.

Newman, Paul. 2000. *The Hausa language: An encyclopedic reference grammar*. New Haven: Yale University Press.

Newman, Stanley. 1947. “Bella Coola I: Phonology”, *International Journal of American Linguistics* 13: 129-134

Ní Chasaide, Ailbhe. 1979. “Laterals of Gaoth Dobhair Irish and of Hiberno English”, *Occassional Papers in Linguistics and Language Learning 6, Papers in Celtic Phonology*: 54-78.

Ní Chiosáin, Máire and Jaye Padgett. 2001. “Markedness, segment realization, and locality in spreading”, in: Lombardi, Linda (ed.), *Segmental phonology in Optimality Theory: Constraints and representations*. Cambridge: Cambridge University Press, 118–156.

Ní Chiosáin, Máire and Jaye Padgett. 2012. “An acoustic and perceptual study of Connemara Irish palatalization”, *Journal of the International Phonetic Society* 42.2: 171-191.

Ní Chiosáin, Máire. 1991. Topics in the Phonology of Irish [Unpublished PhD dissertation, University of Massachusetts Amherst].

Nikolaev, Alexander. 2010. Old Irish *ro·ír* and other í-preterites. (Paper presented at the *30th Annual Harvard Celtic Colloquium*, 8 October, 2010).

Nikolaeva, Natalia. 2003. “On the historical morphology of the Old Irish verb *téit* ‘goes’”, in: Rasmussen, Jens Elmegård and Thomas Olander (eds.), *Internal reconstruction in Indo-European: Methods, results and problems*. Copenhagen: Museum Tusculanum Press, 181-186.

Norman, Jerry. 1994. “Pharyngealization in Early Chinese”, *Journal of the American Oriental Society* 114: 397-408.

Núñez, Rafael E. and Eve Sweetser. 2006. “With the future behind them: Convergent evidence from Aymara language and gesture in the crosslinguistic comparison of spatial construals of time”, *Cognitive Science* 30: 1-49.

Ó Baoill, Colm. 1978. *Contributions to a comparative study of Ulster Irish and Scottish Gaelic*. Belfast: Queen's University.

Ó Baoill, Colm. 2000. "The Gaelic continuum", *Éigse* 32: 121-134.

Ó Cróinín, Dáibhi. 2001. "The earliest Irish glosses", in: Rolf Bergmann, Elvira Glaser, and Claudine Moulin-Fankhänel (eds.), *Mittelalterliche volkssprachige Glossen: internationale Fachkonferenz des Zentrums für Mittelalterstudien der Otto-Friedrich-Universität Bamberg 2. bis 4. August 1999*. Heidelberg: C. Winter.

Ó Crualaoich, Conchobhar. 1997. "Syncope patterns in denominative verbs", *Ériu* 48: 239-264.

Ó Cuív, Brian. 1944. *The Irish of West Muskerry, Co. Cork: A phonetic study*. Dublin: Dublin Institute for Advanced Studies.

Ó Cuív, Shán. 1921. *The sounds of Irish*. Dublin: Browne and Nolan.

Ó Curnáin, Brian. 2007. *The Irish of Iorras Aithneach, County Galway*. Dublin: Dublin Institute for Advanced Studies.

Ó Direáin, Seamas. 2015. *A survey of spoken Irish in the Aran Islands, Co. Galway*. Galway: National University of Ireland, Galway.

Ó Dochartaigh, Cathair. 1978. "Lenition and dependency phonology", *Éigse* 17: 457-494.

Ó hUiginn, Ruairí. 1989. "*Tongu do dia toinges mo thuath* and related expressions", in: Breatnach, Liam; Kim McCone and Donnchadh Ó Corráin (eds.), *Sages, saints and storytellers: Celtic studies in honour of Professor James Carney*. Maynooth: An Sagart., 332-41.

Ó Máille, Tomás. 1927. *Urlabhraidheacht agus graimear na gaedhilge, cuid I* [Articulation and grammar of Irish, Part I]. Baile Átha Cliath: Comhlucht oideachais na hÉireann.

Ó Máille, Tomás. 1936. "An Irish dialect survey and some general principles of phonetic notation", in: Jones, Daniel and D. B. Fry. *Proceedings of the Second International Congress of Phonetic Sciences*. London: Cambridge University Press, 102-5.

Ó Maolalaigh, Roibeard. 1997. The historical short vowel phonology of Gaelic [Unpublished PhD dissertation, University of Edinburgh].

Ó Maolalaigh, Roibeard. 2003. "Varia III. Vocalic Variation in air-, aur-", *Ériu* 53: 163-169.

Ó Murchú, Mairtín. 1969. Review of *The dialects of Co. Clare,* Part 1 by Nils Holmer, *Lochlann* 4: 345-348 .

Ó Murchú, Mairtín. 1990. *The School of Celtic Studies, fiftieth anniversary report, 1940-1990*. Dublin: Dublin Institute of Advanced Studies.

Ó Sé, Diarmuid. 1982. Gaeilge Chorca Dhuibhne: An fhóneolaíocht agus an deilbhíocht [The Irish of Corca Dhuibhne: Phonology and accidence] [Unpublished PhD dissertation, University College Dublin].

Ó Sé, Diarmuid. 2000. *Gaeilge Chorca Dhuibhne*. Baile Átha Cliath: Institiúid Teangeolaíochta Éireann.

Ó Siadhail, Micheál and Arndt Wigger. 1975. *Córas fuaimeanna na Gaeilge: Na canúintí agus an caighdeán* [The sound system of Irish: the dialects and the standard]. Dublin: Dublin Institute for Advanced Studies.

Ó Siadhail, Micheál. 1989. *Modern Irish: Grammatical structure and dialectical Variation*. Cambridge: Cambridge University Press.

O'Connell, F. W. 1912. *A grammar of Old Irish*. Belfast: Mayne, Boyd & Sons.

O'Donovan, John. 1845. *A grammar of the Irish language: Published for the use of the senior classes in the College of St. Columbia*. Dublin: Hodges and Smith.

O'Flanagan, M. 1904. *Irish Phonetics*. Brown and Nolan.

Oftedal, Magne. 1956. "The Gaelic of Leurbost, Isle of Lewis", *Norsk Tidskrift for Sprogvidenskap*, Suppl. Bind 4.

Oftedal, Magne. 1962. "A morphemic evaluation of the Celtic initial mutations", *Lochlann* 2: 93-102.

Oftedal, Magne. 1963. "On "Palatalized" Labials in Scottish Gaelic', *Scottish Gaelic Studies* 10: 71-81.

Oftedal, Magne. 1982. *Lenition in Celtic and in Insular Spanish: The secondary voicing of stops in Gran Canaria*. Oslo: Universitetsforlaget.

Ogden, Richard and John Kelly. 2003. "Carnochan, Scott & Whitley's prosodic analysis of French regular verbs", *Transactions of the Philological Society* 101: 57–80.

Ohala, John J. 1992. "Alternatives to the sonority hierarchy for explaining the shape of morphemes", *Papers from the Parasession on the syllable, Chicago Linguistic Society., Chicago*: 319-338.

Padgett, Jaye. 2001. “Contrast dispersion and Russian palatalization”, in: Elizabeth Hume and Keith Johnson (eds.), *The role of speech perception in phonology*. San Diego, CA: Academic Press, 187–218.

Palmquist, Stephen. 2006. “Silence as the ultimate fulfilment of the philosophical quest”, *Hekmat va Falsafeh* 2.2: 67-76.

Pawley, Andrew Kenneth. 1966. The structure of Karam. [Unpublished PhD dissertation, University of Auckland].

Pearce, Mary. 2003. Vowel harmony in Kera. Chadic. [Unpublished MA dissertation, University College London].

Pearce, Mary. 2008. “Vowel harmony domains and vowel undershoot”, *University College London Working Papers in Linguistics* 20: 115-140.

Pedersen, Holgar. 1897. *Aspirationen i Irsk, en sproghistorik Undersoegelse* [Aspiration in Irish, a linguistic history study]. Leipzig.

Pedersen, Holgar. 1909. *Vergleichende Grammatik der keltischen Sprachen*. Göttingen: Vandenhoeck & Ruprecht.

Peterson, Tyler. 2003. “Minimality and syllabification in Kabardian”, *Papers from the Annual Meeting of the Chicago Linguistics Society*. 39.1: 215-235.

Petrovici, Émile. 1956. “Equisse du système phonologique du Roumain”, in: Jakobson, Roman and Morris Halle (eds.), *For Roman Jakobson: Essays on the occasion of his sixtieth birthday, 11 October 1956*. The Hague: Mouton, 382-389.

Pierrehumbert, Janet B. 1990. “Phonological and phonetic representation”, *Journal of Phonetics* 18: 375-394.

Pike, Eunice V. 1964. “The Phonology of New Guinea Highland Languages”, *American Anthropologist* 66.4: 121-132.

Pokorny, Julius. 1913. “A Concise Old Irish Grammar”, *The Celtic Review* 8: 267-288.

Pokorny, Julius. 1925. *Altirische Grammatik*. Berlin: de Gruyter.

Pokorny, Julius. 1949. “Zum nicht-indogermanischen Substrat im Inselkeltischen”, *Die Sprache* 1: 235-245.

Port, Richard F. and Adam P. Leary. 2005. “Against Formal Phonology”, *Language* 81: 927-64.

Port, Robert F. 2010a. “Rich memory and distributed phonology”, *Language Sciences* 32: 43-55.

Port, Robert F. 2010b. “The reality of phonological forms: A rejoinder”, *Language Sciences* 32: 60-62.

Prósper, Blanca María. 2002. *Lenguas y religiones prerromanas del occidente de la Península Ibérica* [Pre-Roman languages and religions of the west of the Iberian peninsula]. Salamanca: Ediciones Universidad de Salamanca.

Provoost, D. Pierre and Pierre S.Koulifa. 1987. *Essai sur la langue uldeme*. Tervuren: Musée royal de l'Afrique centrale.

Pulleyblank, Edwin G. 1970-71. “Late Middle Chinese”, *Asia Major* 15: 197-239; 16: 121-68.

Pulleyblank, Edwin G. 1983. *Middle Chinese: A study in historical phonology*. Vancouver: University of British Colombia Press.

Pulleyblank, Edwin G. 1996. “Prosody or Pharyngealization in Old Chinese? The Origin of the Distinction between Type A and Type B syllables”, *Journal of the American Oriental Society* 116: 105-107.

Pulleyblank, Edwin G. 1998. “Pharyngeal glides and zero initials in Chinese”, T'sou, Benjamin K. and Zou Jiayan (eds.), *Studia Linguistica Serica*. Hong Kong: City University of Hong Kong, 1-26.

Quiggin, E. C. 1906. *A dialect of Donegal*. Cambridge: Cambridge University Press.

Quin, E. G. 1975. *Old-Irish workbook*. Dublin: Royal Irish Academy.

Quin, E. G. 1978. “The origin of the f-future: An alternative explanation”, *Ériu* 29: 13-25.

Quin, E. G. et al. (eds.) 2007 [1913-75]. *Dictionary of the Irish language, based mainly on Old and Middle Irish materials*. Dublin: Royal Irish Academy.

Redden, James E. 1965. *Walapai phonology and morphology*. PhD dissertation, Indiana State University.

Reformatsky, Alexander A. (1988). *Selected writings*. Moscow: Progress.

Reformatsky, Alexander A. (ed.). 1970. *Из истории отечественной фонологии*. [From the history of Russian Phonology]. Moscow: Nauka

Reformatsky, Alexander A. 1966. “Иерархия фонологических единиц и явления сингармонизма” [The hierarchy of phonological units and the phenomenon of synharmonism], in: Shaumyan, Sebastian Konstantinovich (ed.), *Исследования по фонологии*. [Studies in Phonology]. Moscow: Nauka. [Reprinted in:

Reformatsky, A. A. (ed.). 1970. *Из истории отечественной фонологии*. [From the history of Russian Phonology]. Moscow: Nauka, 197-212].

Roberts, James S. 2001. "Phonological features of Central Chadic languages", in: Mutaka, Ngessimo M. and Sammy B. Chumbow. *Research mate in African linguistics: Focus on Cameroon*. Köln: Rüdiger Köppe Verlag, 93-118.

Roberts, James S. 2009. "Palatalization and labialization in Mawa. (Eastern Chadic)", in: Rothmaler, Eva (ed.), *Topics in Chadic linguistics V: Comparative and descriptive studies*. Köln: Rüdiger Köppe Verlag, 129-140.

Rodríguez Ramos, Jesús. 2002. "Las inscripciones sudlusitano-tartesias: Su función, lingua y contexto socioeconómico" [The south Lusitanian-Tartessian inscriptions: Their function, language and socioeconomic context], *Complutum* 13: 85-95.

Róna-Tas, András. 1998. "Turkic writing systems", Johanson, Lars and Éva Á. Cható (eds.), *The Turkic Languages*. London: Routledge, 126-137.

Rood, David S. 1975. "Implications of Wichita phonology", *Language* 51: 315-337.

Rood, David S. 1976. *Wichita grammar*. New York: Garland.

Ruff, Naomi Joy. 2005. *Phonology of Lagwan. Logone-Birni Kotoko.* Yaoundé: SIL.

Sapir, Edward. 1930. "Southern Paiute, a Shoshonean language", *Proceedings of the American Academy of Arts and Sciences* 65.1: 1-296.

Sapir, Edward. 1933. "La réalité psychologique des phonèmes", *Journal de Psychologie normale et pathologique* 30: 247-265.

Sartre, Jean-Paul. 1948. *Qu'est-ce que la littérature*. Paris: Gallimard.

Saussure, Ferdinand de. 1879. *Mémoire sur le système primitif des voyelles dans les langues indo-européenes*. Leipzig: Teubner.

Saussure, Ferdinand de. 1916. *Cours de linguistique générale*. (Edited C. Bally and A. Sechehaye, with the collaboration of A. Riedlinger) Lausanne and Paris: Payot.

Scheer, Tobias. 2004. *A lateral theory of phonology: What is CVCV, and why should it be?, Volume 1*. Berlin: Mouton de Gruyter.

Schmidt, Karl Horst. 1977. *Die festlandkeltischen Sprachen*. Innsbruck: Institut für Sprachwissenschaft der Universität Innsbruck.

Schrijver, Peter. 1995. *Studies in British Celtic historical phonology*. Amsterdam: Rodopi.

Schuh, Russel G. 1998. *A Grammar of Miya*. Berkeley: University of California Press.

Schuh, Russell G. 1971. Ngizim phonology. [Unpublished ms, UCLA] (http://www.linguistics.ucla.edu/people/schuh/downloadable_papers.html) (date of access: 31 Dec. 2013)

Schuh, Russell G. 1978. "Bade/Ngizim vowels and syllable structure", *Studies in African Linguistics* 9.3: 247-283.

Schuh, Russell G. 1984. *Données de la langue gidar. Ma kad'a.* [Unpublished ms, UCLA] (http://www.linguistics.ucla.edu/people/schuh/downloadable_papers.html) (date of access: 31 Dec. 2013)

Schuh, Russell G. 2010. Review of *A Grammar of Gidar* by Zygmunt Frajzyngier, *Afrika und Übersee* 91: 119-136.

Schuh, Russell G. and Yalwa, Lawan D. 1999. "Hausa", in: International Phonetic Association (ed.), *Handbook of the International Phonetic Association: A guide to the use of the International Phonetic Alphabet*. Cambridge: Cambridge University Press, 90-95.

Schulze-Thulin, Britta. 1996. "Old Norse in Ireland", in: P. Sture Ureland and Iain Clarkson, *Language contact across the North Atlantic*. Tübingen: Niemeyer, 83–113.

Schulze-Thulin, Britta. 2001. *Studien zu den urindogermanischen o-stufigen Kausativa/Iterativa und Nasalpräsentien im Kymrischen*. Innsbruck: Institut für Sprachwissenschaft der Universität Innsbruck.

Schumacher, Stefan. 2004. *Die Keltischen Primärverben. Ein vergleichendes, etymologisches und morphologisches Lexikon*. Innsbruck: Institut für Sprachwissenschaft der Universität Innsbruck.

Schutz, Alfred. [1932] 1967. *Der Sinnhafte Aufbau der sozialen Welt* [The phenomenology of the social world]. (Translated by George Walsh and Frederick Lehnert) Northwestern University Press. [Originally published, Wien: Springer].

Schwartz, Geoffrey. 2013. "A representational parameter for onsetless syllables", *Journal of Linguistics* 49.3: 1-34.

Schwartz, Geoffrey. 2015. "Who needs a nucleus? Tashlhiyt Berber syllabification in the Onset Prominence representational environment", *Poznań Studies in Contemporary Linguistics* 51.2: 247-290.

Schwartz, Geoffrey. 2016. “On the evolution of prosodic boundaries: Parameter settings for Polish and English”, *Lingua* 171: 37-73.

Schwartz, Jean-Luc, Louis-Jean Boë, Nathalie Vallée and Christian Abry. 1997. “Major trends in vowel system inventories”, *Journal of Phonetics* 25: 233-253.

Ségéral, Philippe and Scheer, Tobias. 2001. “Abstractness in phonology: The case of virtual geminates”, in: Dziubalska-Kołaczyk (ed.), *Constraints and preferences*. Berlin & New York: Mouton de Gruyter, 311-337.

Seibert, Uwe. 1998. *Das Ron von Daffo. Jos-Plateau, Zentralnigeria): Morphologische, syntaktische und textlinguistische Strukturen einer westtschadischen Sprache*. Frankfurt am Main: Peter Lang.

Seiden, William. 1963. *Havasupai Phonology and Morphology*. PhD dissertation, Indiana State University.

Shaterian, Alan William. 1976. “No more schwa for Yavapai”, in Redden, James E. (ed.), *Proceedings of the First Yuman Languages Workshop, held at the University of California, San Diego, June 16-21, 1975*. Carbondale: North Illinois University, 129-133.

Shaterian, Alan William. 1983. Phonology and dictionary of Yavapai. [Unpublished PhD dissertation, University of California, Berkeley].

Shryock, Aaron Michael. 1995. *Investigating laryngeal contrasts: An acoustic study of the consonants of Musey*. Los Angeles: Phonetics Laboratory, Dept. of Linguistics, UCLA.

Simpson, Adrian P. 1999. “Fundamental problems in comparative phonetics and phonology: does UPSID help to solve them”, *Proceedings of the 14th International Congress of Phonetic Sciences*: 349-352.

Simpson, Adrian P. 2005. “From a Grammatical Angle: Congruence in Eileen Whitley’s phonology of English”, *York Papers in Linguistics* 2.4: 49-90.

Sims-Williams, Patrick. 1984. “The double system of verbal inflexion in Old Irish”, *Transactions of the Philological Society* 82” 138-201.

Sims-Williams, Patrick. 2003. *The Celtic inscriptions of Britain: Phonology and chronology, c. 400-1200.* Oxford: Blackwell.

Sjoestedt-Jonval, Marie-Louise. 1938. *Description d’un parler irlandais de Kerry*. Paris: Champion.

Skerrett, R. A. Q. 1967. “Notes on the dialect of the Inishkea Islanders”, *Studia Celtica* 2: 196-201 .

Skinner, B. F. 1957. *Verbal behavior*. New York: Appleton-Century-Crofts.

Smirnova, Mirra Aleksandrovna. 1960. Язык хауса [Hausa Language]. [Reprinted 1983. *The Hausa language: A descriptive grammar*. London: Routledge & Kegan Paul. (Translated by G. L. Cambell)].

Smith, Tony. 1999. *Muyang Phonology*. Yaoundé: SIL.

Sobkowiak, Włodzimierz. 1997. “Silence and markedness theory”, in: Adam Jaworski (ed.), *Silence: Interdisciplinary perspectives*. Berlin: Mouton de Gruyter, 39-61.

Solé, Maria-Josep and Ohala, John J. 2010. “What is and what is not under the control of the speaker: intrinsic vowel duration”, *Laboratory phonology* 10: 607-655.

Sommerfelt, Alf. 1922a. *The dialect of Torr, Co. Donegal*. Kristiania: Brøggers

Sommerfelt, Alf. 1922b. “Un cas de coup de glotte en irlandais”, *Mémoires de la Société Linguistique de Paris* 20: 7-14.

Sommerfelt, Alf. 1929a. “South Armagh Irish”, *Norsk Tidsskrift for Sprogvidenskap* 2: 107-191.

Sommerfelt, Alf. 1929b. Review of *Urlabhraidheacht agus graiméar na Gaedhilge* by Tomás Ó Máille, *Norsk Tidsskrift for Sprogvidenskap* 3: 306-308.

Sommerfelt, Alf. 1952. “Norse-Gaelic contacts”, *Norsk Tidskrift for Sprogvidenskap* 16: 226-236.

Sommerfelt, Alf. 1963. “Caractère et développement du système vocalique vieil-irlandais”, *Études celtiques* 10: 7-17.

Sontag, Susan. 1969. “The Aesthetics of Silence”, in: Sontag, Susan (ed.), *Styles of Radical Will*. New York: Farrar, Straus and Giroux.

Staalsen, Philip. 1963. *Big Sepik. (Iatmul) phonemes*. Ukarumpa: SIL manuscript.

Staalsen, Philip. 1966. “The phonemes of Iatmul”, *Papers in New Guinea Linguistics* 5: 69-76.

Stachowski, Kamil. 2009. “The discussion on consonant harmony in northwestern Karaim”, *Türkbilig* 18: 158-193.

Steiner, George. 1967. *Language and silence: Essays on language, literature, and the inhuman*. New York: Atheneum.

Stevens, Kenneth N. and Sheila E. Blumstein. 1978. “Invariant cues for place of articulation in stop consonants”, *Journal of the Acoustical Society of America* 64: 5: 1358-1368.

Stewart, Thomas W. 2004. Mutation as morphology: Bases, stems, and shaper in Scottish Gaelic [PhD dissertation, Ohio State University].

Stifter, David. 2006. *Sengoídelc* [Old Irish]. New York: Syracuse.

Stockman, Gerard. 1974. *The Irish of Achill, Co. Mayo*. Belfast: Queen's University Belfast.

Stokes, Judith. 1981. “Anindilyakwa phonology: from phoneme to syllable”, in: Waters Waters, Bruce (ed.), *Australian phonologies: Collected papers*. Darwin: Summer Institute of Linguistics, 139-182.

Strachan, John and Meyer, Kuno. 1908. *An introduction to Early Welsh*. Manchester: Universtiy Press.

Strachan, John. 1904. “An Old Irish metrical rule”, *Ériu* 1: 191-208.

Strachan, John. 1909. *Old Irish paradigms and selections from the Old-Irish glosses: With notes and vocabulary*. Dublin: School of Irish Learning.

Stump, Gregory T. 2001. *Inflectional morphology: A theory of paradigm structure*. Cambridge: Cambridge University Press.

Swadesh, Morris. 1934. “The phonemic principle”, *Language* 10.2: 117-129.

Swingle, Kari. 1993. “The Irish and other mutations”, in Mead, Jonathan (ed.), *Proceedings of West Coast Conference on Formal Linguistics* 11. Stanford: Center for the Study of Language and Information, 451-466.

Sylak, John. 2011. Exhaustive and restrictive syllabification in Bella Coola. Nuxalk. (Paper given at Phonetics and Phonology Workshop, Department of Linguistics, Stanford University, 2 May 2011).

Syrdal, Ann K. and H. S. Gopal. 1985. “A perceptual model of vowel recognition based on the auditory representation of American English vowels”, *Journal of the Acoustical Society of America* 79.4: 1086-1100.

Szemerényi, Oswald. 1967. “The new look of Indo-European: Reconstruction and typology”, *Phonetica* 17.2: 65–99.

Szereményi, Oswald. 1964. “Structuralism and substratum - Indo-Europeans and Semites in the Ancient Near East”, *Lingua* 13: 1-29.

Tabain, Marija and Gavan Breen. 2011. “Central vowels in Central Arrernte: A spectrographic study of a small vowel system”, *Journal of Phonetics* 39: 68-84.

Tabain, Marija; Gavan Breen and Andrew R. Butcher. 2004. “VC vs CV syllables: A comparison of Aboriginal languages with English”, *Journal of the International Phonetic Association* 34.2: 175-200.

Taylor, John R. 1989. *Linguistic categorization: Prototypes in linguistic theory*. Oxford: Clarendon Press.

Tekin, Talat. 1967. *A grammar of Orkhon Turkic*. The Hague: Mouton.

Ternes, Elmar. 1990. “Initial mutations in Celtic and West African languages: Synchrony and diachrony”, *Afrika und Übersee* 73: 3-17.

Thomson, R. L. 1984. “The history of the Celtic languages in the British Isles”, in: Trudgill, Peter. *Language in the British Isles*. Cambridge: Cambridge University Press, 241-258.

Thurneysen, Rudolf. 1909. *Handbuch des Alt-Irischen*. Heidelberg: Carl Winter.

Thurneysen, Rudolf. 1928. *Die Bürgschaft im irischen Recht*. Berlin: Verlag der Akademie der wissenschaften.

Thurneysen, Rudolf. 1946. *A grammar of Old Irish*. Dublin: Dublin Institute of Advanced Studies.

Todd, James Henthorn. 1870. “Descriptive catalogue of the contents of the Irish manuscript, commonly called ‘The Book of Fermoy’”, *Proceedings of the Royal Irish Academy*, Irish MSS series, 1.1: 3-65.

Tokizaki, Hisao. 2008. *Syntactic structure and silence: A minimalist theory of syntax-phonology interface*. Tokyo: Hitsuji Shobō.

Tomasello, Michael. 1999. *The cultural origins of human cognition*. Cambridge Ma.: Harvard University Press.

Traunmüller, Hartmut. 1990. “Analytical expressions for the tonotopic sensory scale”, *Journal of the Acoustical Society of America* 88: 97-101.

Trubetzkoy, Nikolai S. 1925. Review of *Tablitsy fonetiki kabardinskogo jazyka* by Nikolai F. Jakovlev in Bulletin de Société Linguistique 26: 277-281.

Trubetzkoy, Nikolai S. 1931. “Gedanken über Morphonologie”, *Travaux du Cercle Linguistique de Prague* 4: 53-61.

Trubetzkoy, Nikolai S. 1939. *Grundzüge der Phonologie*. Prague: Travaux du Cercle Linguistique de Prague 7. [Translated by Baltaxe, Christiane A. M. *Principles of Phonology*. Berkeley: California.]

Trubetzkoy, Nikolai S. 1975. *N. S. Trubetzkoy's letters and notes*. Berlin: Mouton.

Trubetzkoy, Nikolai S.. 1938. "Die Quantität als phonologisches Problem", *Actes du Quatrième Congrès international de linguists*. Copenhagen: Munksgaard, 118-22.

Turpin, Myfany and Katherine Demuth. 2012. Stress in Katetye. (Paper given at the 14th Australasian International Conference on Speech Science and Technology Workshop on the Phonetic Analysis of Rhythm in Indigeneous Languages, December 3-6, 2012).

Twaddell, W. Freeman. 1935. "On defining the phoneme", *Language* 11.1: 5-62.

Vachek, Josef. 1935. "Several thoughts on several statements of the phoneme theory", *American Speech* 10.4: 243-255.

Vaissière, Jacqueline. 2011. "On the acoustic and perceptual characterization of reference vowels in a cross-language perspective", *Proceedings of the 17th International Congress of the Phonetic Sciences, Hong Kong, 17-21 August, 2011*: 52-59.

Vallée, Nathalie; Louis-Jean Boë, Jean-Luc Schwartz, Pierre Badin, and Christian Abry. 2002. "The weight of phonetic substance in the structure of sound inventories", *ZAS Papers in Linguistics* 28: 145-168.

Vaux, Bert and Briget Samuels. 2005. "Laryngeal markedness and aspiration", *Phonology* 22.3: 395-436.

Vendryes, Joseph. 1906. "Sur la chronologie des phénomènes de métaphonie et d'infection en irlandais", *Mémoires de la Societé Linguistique* 14: 393-411.

Vendryes, Joseph. 1908. *Grammaire du vieil-Irlandais: Phonétique, morphologie, syntaxe*. Paris: E. Guilmoto.

Vendryes, Joseph. 1921. *Le langage: Introduction linguistique à l'histoire*. Paris: La renaissance du livre.

Vendryes, Joseph. 1959. *Lexique étymologique de l'irlandais ancien*. Dublin: Dublin Institute for Advanced Studies.

Viel, Michael. 2010. “N. S. Trubetzkoy, England and the English language”, in: Malá, Markéta, Martin Procházka and Pavlína Šaldová (eds.), *The Prague School and theories of structure*. Göttingen: V&R Unipress, 21-44.

Viljoen, Melanie. 2009. *A phonology of Buwal*. Yaoundé: SIL.

Viljoen, Melanie. 2013. A grammatical description of Buwal. [Unpublished PhD dissertation, La Trobe University, Victoria, Australia].

Vogt, Hans. 1963. *Dictionnaire de la langue oubykh*. Universitetsforlaget: Oslo.

Wagner, Heinrich. 1958-64. *Linguistic atlas and survey of Irish dialects*. Dublin: Institute for Advanced Studies.

Wagner, Heinrich. 1959a. *Gaeilge Theilinn: Foghraidheacht, gramadach, téacsanna* [The Irish of Teilinn: pronunciation, grammar, texts] Dublin: Dublin Institute for Advanced Studies.

Wagner, Heinrich. 1959b. *Das Verbum in den Sprachen der britischen Inseln*. Tübingen: Niemeyer.

Wagner, Heinrich. 1959c. “Zum wort for ‘Beine’ im Irischen”, *Zeitschrift für Vergleichende Sprachforschung* 76: 81-84.

Wagner, Heinrich. 1964. “Nordeuropäische Lautgeographie”, *Zeitschrift für celtische Philologie* 29: 225-298.

Wang, Jenny Zhijie. 1993. The geometry of segmental features in Beijing Mandarin. [Unpublished PhD dissertation, University of Delaware, Newark].

Wanner, Dieter. 1989. “The continuum of verb position typology in Romance”, in: Kirschner, Carl and Janet Ann DeCesaris (eds.), *Studies in Romance Linguistics: Selected Proceedings from the XVII Linguistic Symposium on Romance Languages*. Amsterdam: John Benjamins, 443-477.

Wares, Alan Campbell. 1968. *A comparative study of Yuman consonantism*. The Hague: Mouton.

Waterson, Natalie. 1956. “Some aspects of the phonology of the nominal forms of the Turkish word”, *Bulletin of the School of Oriental and African Studies* 18.3: 578-591.

Waterson, Natalie. 1987. *Prosodic phonology: The theory and its application to language acquisition and speech processing*. Newcastle upon Tyne: Grevatt & Grevatt.

Watkins, Calvert. 1962. *The Indo-European origins of the Celtic verb: I. The sigmatic aorist*. Dublin: Dublin Institute of Advanced Studies.

Watkins, Calvert. 1966. "The origin of the f-future", *Ériu* 20: 67-81

Watson, Janet C. E. 2002. *The phonology and morphology of Arabic*. Oxford: Oxford University Press.

Weijer, Jeroen van de. 1996. *Segmental Structure and Complex Segments*. Tübingen: Niemeyer.

Weijer, Jeroen van de. 2011. "Secondary and double articulation", in van Oostendorp, Marc, Colin J. Ewen, Elisabeth V. Hume and Keren Rice (eds.), *The Blackwell companion to phonology*. London: Wiley Blackwell, 694-710.

Welby, Pauline, Máire Ní Chiosáin, and Brian Ó Raghallaigh. 2011. "A phonetic investigation of Irish eclipsis: Preliminary results and challenges", *Proceedings of the 17th International Congress of Phonetic Sciences*: 2122-5.

Whalen, D. H. and Andrea G. Levitt. 1995. "The universality of intrinsic F0 of vowels", *Journal of Phonetics* 23: 349–366.

Whitley, Eileen. 1959a. Prosodies of the word and phrase in modern spoken Irish. (Paper presented at the First International Congress of Celtic Studies, Dublin, 1959).

Whitley, Eileen. 1959b. Word prosodies and phrase prosodies in modern Irish. (Paper presented at SOAS seminar, London, 1959).

Whorf, Benjamin Lee. 1956. *Language, thought, and reality: Selected writings of Benjamin Lee Whorf*. Cambridge, MA: MIT Press.

Willson, Heather. 2003. A brief introduction to Marshallese phonology. (http://linguistics.byu.edu/faculty/hwills1/) (date of access: 31 Oct. 2013)

Windisch, Ernst. 1879. *Kurzgefasste irische Grammatik mit Lesestücken*. Leipzig: Hirzel.

Wodtko, Dagmar. 2003. An outline of Celtiberian grammar. (http://www.freidok.uni-freiburg.de/ volltexte/747/) (date of access: 18 Feb. 2013).

Wolfe, Sam. 2015. "Verb initial orders in Old Romance: A Comparative Account", *Revue roumaine de linguistique* 60: 147-172.

Wolff, Ekkehard. 1983. *A grammar of the Lamang language: gwàd làmàn*. Glückstadt: J. J. Augustin.

Wolff, Ekkehard. 2004. “Segments and prosodies in Chadic: On descriptive and explanatory adequacy, historical reconstructions, and the status of Lamang-Hdi”, in: Akinlabi, Akinbiyi and Oluseye Adesola (eds.). *Proceedings of the 4th World Congress of African Linguistics, New Brunswick 2003*. Köln: Köppe, 43-65.

Wolff, Ekkehard. 2008. Issues in the historical phonology of Chadic languages. (Paper presented at Max Planck Institute for Evolutionary Anthropology, Leipzig, at Leipzig Spring School on Linguistic Diversity, 26 March - 4 April 2008).

Wood, Sidney A. J. 1990. “Vertical, monovocalic and other ‘impossible’ vowel systems: A review of the articulation of the Kabardian vowels”, *Lund University Linguistics Working Papers* 36: 191-212.

Wood, Sidney A. J. 1994. “A spectrographic analysis of vowel allophones in Kabardian”, *Lund University Linguistics Working Papers* 42: 241-50.

Wurm, Stephen A. 1972. *Languages of Australia and Tasmania*. The Hague: Mouton.

Wurm, Stephen A. 1982. *The Papuan languages of Oceania*. Tübingen: Gunter Narr.

Younansardaroud, Helen. 2001. *Der neuostaramäische Dialekt von Särdä:rïd*. Wiesbaden: Harrassowitz.

Younes, M. 1993. “Emphasis spread in two Arabic dialects”, in M. Eid and C. Holes (eds.), *Perspectives on Arabic linguistics* V. Amsterdam: John Benjamins, 119-45.

Zair, Nicholas. 2009. “OIr. biid < *bhuH-ye/o- and ‘hiatus’ verbs”, in: Jamison, Stephanie, Craig Melchert and Brent Vine (eds.), *Proceedings of the 20th UCLA Indo-European Conference: Los Angeles 2008*. Bremen: Hempen Verlag, 213-200.

Zawaydeh B.A. 1999. The phonetics and phonology of gutturals in Arabic. [Unpublished PhD dissertation, Indiana University].

Zee, Eric and Wai Sum Lee. 2007. “Vowel typology in Chinese”, *Proceedings of the 16th International Congress of Phonetic Sciences, Saarbrücken, 6-10 August, 2007*: 6-10.

Zeuß, Johann Kaspar. 1853. *Grammatica Celtica*. Paris: Maisonneuve.

Zewen, François-Xavier Nicolas. 1977. *The Marshallese language: A study of its phonology, morphology, and syntax*. Berlin: Verlag von Dietrich Reimer.

Zwicker, Eberhard. 1961. “Subdivision of the audible frequency range into critical bands”, *The Journal of the Acoustical Society of America* 33.2: 248-248.